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## NuMeCan - Nutrition metabolisms and cancer

Rapport Hcéres

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# HCERES

High Council for the Evaluation of Research  
and Higher Education

Research units

HCERES report on research unit:

Nutrition, Metabolisms and Cancer

NuMeCan

Under the supervision of  
the following institutions  
and research bodies:

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

Institut National de la Recherche Agronomique - INRA

Université de Rennes 1

# 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>*

Matias A. Avila, 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 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:	Nutrition, Metabolisms and Cancer
Unit acronym:	NuMeCan
Label requested:	UMR
Current number:	UMR-991 Inserm; U-1341 Inra; EA-1254 University of Rennes 1
Name of Director (2015-2016):	Mr Bruno CLÉMENT
Name of Project Leader (2017-2021):	Mr Bruno CLÉMENT

## Expert committee members

Chair:	Mr Matias A. AVILA, University of Navarra, Pamplona, Spain.
Experts:	Mr Hervé BLOTTIERE, Institut Micalis, INRA, Jouy-en-Josas (representative of INRA)
	Mr José Carlos FERNÁNDEZ-CHECA, Idibaps-CSIC, Barcelona, Spain
	Mr Juan IOVANNA, Inserm, Marseille (representative of INSERM)
	Ms Susanne LA FLEUR, Academic Medical Center, Amsterdam, The Netherlands
	Ms Graça PORTO, IBMC, University of Porto, Portugal

### Scientific delegate representing the HCERES:

Mr Jean GIRARD

### Representatives of supervising institutions and bodies:

Mr Jean DALONGEVILLE, INRA

Ms Marianne DESMEDT, INSERM

Mr Alain DUPUY, CHU de Rennes

Ms Christine GUILLARD, INSERM

Mr Francois GUILLET, Centre régional de lutte contre le cancer

Mr Patrick HERPIN, INRA

Mr Claude LABIT, University of Rennes 1

Mr Jean-Claude POZZO DI BORGO, CHU de Rennes

### Head of Doctoral School:

Ms Nathalie THERET, ED n° 92 "Vie Agro Santé" (VAS)

## 1 • Introduction

### History and geographical location of the unit

The NuMeCan unit emerges from the combination of seven teams from three former units, namely “Liver, Metabolisms and Cancer” Inserm URM 991, headed by Mr Bruno CLÉMENT; “Food and Digestive, Nervous and Behavioral Adaptations” (ADNC) Inra U1341, headed by Mr David VAL-LAILLET; and “Microbiology and Infectious Risks” University of Rennes 1 U-EA1254, headed by Ms Martine BONNAURE-MALLET. The “Liver, Metabolisms and Cancer” unit is the current expression of a remarkable and long-standing research tradition in the field of clinical and basic hepatology in Rennes that started in the 60’s. The INRA ADNC unit was created at the beginning of 2012 from the fusion of two former INRA research teams, and, among other aspects, brings in experience in large animal models of mal/nutrition and dietary-associated metabolic impairments. Finally, the “Microbiology and Infectious risks” unit was created in 1992, and thus it is also a long-standing research team in the field of infectious diseases. These three units merge now in the NuMeCan project, under the direction of Mr Bruno CLÉMENT. The new unit will be composed of four research teams identified by the acronyms NGB, CIMIAD, EXPRES and TGTC, located at two locations 13 Km apart. At the St. Gilles site (INRA facilities) will be the NGB team, former ADNC unit, and at the Villejean-Pontchaillou site the other three teams. Nevertheless, as stated in the dossier, lab and office spaces will be available at both sites for the use of any of the teams.

### Management team

The management of the unit is entrusted to the board of directors, composed by the director of the unit, who is nominated jointly by INSERM, INRA and the University of Rennes, and two deputy directors (Mr D. VAL-LAILLET from INRA and Mr O. LORÉAL from INSERM). This Board will make strategic decisions and will deal with scientific and technical issues, as well as with aspects related to human resources and the general management of the unit in its monthly meetings.

### HCERES nomenclature

SVE LS4

### Scientific domains

This emerging unit is scientifically focused on the pathophysiology of the gut-liver-brain axis. Within this axis the different teams provide expertise in: nutrition/nutritional disorders and obesity, iron metabolism and iron-associated diseases, the gastrointestinal and hepatic defensive and pathologic responses to noxae of exogenous and endogenous origins, as well as the molecular mechanisms of hepato-pancreatic neoplasias and therapeutic strategies.

### Unit workforce

The number of permanent researchers and professors has increased for the next contract, as well as that of other research support personnel (technicians administrative). It is worth noticing that the number of researchers from various other institutions who will participate in the next project will be increased by approximately 30%.

Unit workforce	Number on 30/06/2015	Number on 01/01/2017
N1: Permanent professors and similar positions	36 [11.4]	43 [13.4]
N2: Permanent researchers from Institutions and similar positions	14 [13.8]	14 [13.3]
N3: Other permanent staff (technicians and administrative personnel)	28 [26.5]	23 [21.5]
N4: Other professors (Emeritus Professor, on-contract Professor, etc.)	4 [1.6]	
N5: Other researchers from Institutions (Emeritus Research Director, Postdoctoral students, visitors, etc.)	8 [4]	
N6: Other contractual staff (technicians and administrative personnel)	3 [2.5]	
N7: PhD students	32 [32]	
<b>TOTAL N1 to N7</b>	<b>125 [91.8]</b>	
Qualified research supervisors (HDR) or similar positions	31	

Each box indicates the number of staffs; FTP are into brackets

\* Please note that the total includes staffs of the support team in addition to the four teams described below.

Unit record	From 01/01/2010 to 30/06/2015
PhD theses defended	53
Postdoctoral scientists having spent at least 12 months in the unit	3
Number of Research Supervisor Qualifications (HDR) obtained during the period	6

## 2 ● Overall assessment of the unit

### Introduction

The objective of the NuMeCan project is to study the food, environmental, behavioural and metabolic determinants of health and disease, with a focus on liver, digestive and neurobehavioural disorders. The ultimate goal of the Unit is to create a centre of excellence in “nutrition, health and disease” by joining reputed members of three former units from different cultural origins and practices (university, INRA, INSERM, University Hospital). All teams show an expressed willingness to cooperate and create a new dynamic structure that may support the development of strong and internationally competitive translational research projects in the field. The scientific strategy of this unit has evolved from the previous, more liver-centred, project, the “Liver, metabolisms and cancer” unit also headed by the same director. A more transversal and multidisciplinary approach aimed at detecting and treating liver and GI diseases, including cancer, and nutritional disorders will be implemented.

## Global assessment of the unit

Members of the 4 teams within this unit have demonstrated key achievements in the previous contract, which constitutes a solid ground for the present project. Particularly, 3 of the new 4 teams are formed following the research lines of INSERM U991, which has a remarkable international visibility. The novelty of the current project relies on combining diverse expertise to generate new concepts and to develop transversal approaches. Among these, all teams will explore novel molecules and/or pathways that can be transformed into innovative biomarkers and targets for intervention to be implemented and validated in common technological platforms. The recognition that symbioses between humans and the microbiome influence broad aspects of human biology is coming into light, and all teams recognise the importance of addressing these questions in health and disease. Most teams also include objectives devoted to targeted therapies from basic research to clinical validation. To foster the transfer of knowledge to the benefit of patients, the unit stresses the importance of involving clinicians and MD students in all teams, as well as collaborations with other University Hospital research and technology groups. The centralization of a high number of clinicians and scientists on the overall theme of the unit represents a unique environment for knowledge transmission to young investigators and the general public.

## Strengths and opportunities in the context

Most team leaders have a well-recognized scientific reputation in their field, both at national and international levels, and have demonstrated capacity to attract excellent researchers and competitive funding.

Members of all teams participate in international cooperation agreements with research institutions in Europe, North America and Australia, and are regularly invited to national and international conferences.

There is a good balance between basic and clinical research, including the participation of clinician scientists in the teams. The unit benefits from the proximity to hospital structures and access to clinical samples from patients.

The unit is adequately equipped with technological platforms and excellent animal models to perform high quality research.

The teams have proven their capacity to carry out technology transfer and to interact with the industrial and social sectors. This is evidenced by the number of patent applications, research contracts with pharma and food companies, and contributions to guidelines (biobanks management guidelines are worth mentioning).

The present new project is well justified, based on the expertise of the constituting scientists. The recent development of studies on the microbiome linking different teams is an opportunity to strengthen the unit and to develop collaborations.

The integration of projects and expertise in various scientific and technological domains is highly commendable and an asset of this unit. However, it is not a straightforward task (see below).

## Weaknesses and threats in the context

The main foreseen difficulty of the new unit will be the capacity, in practice, to achieve an effective interaction between so drastically different former units and teams with very diverse backgrounds in one new mixed entity.

Trying to incorporate most of the previous research lines of the three merging units into only one with four teams makes that each team includes broad objectives and research lines heterogeneous in quality, novelty and interest.

The management of the research unit at two distant sites may be challenging. The involvement of clinicians, especially for the team located at INRA St Gilles, needs to be well organised, with real presence in the lab.

Although merging between previous teams is proposed, an important risk is that each newly formed team develops their projects with common work limited to technical aspects.

The different sub-projects seem very broad and require prioritization.

Specific actions for research quality assessment, traceability of data and ethical issues are not addressed.

The methods and tools to study the microbiota seem different between teams and not always in adequation with the ambition of the unit. There is no information regarding the technological resources/platform dedicated to metabolite/metabolome analyses.

Although there are other similar units in France, with endocrinology, cardiology, diabetes etc, as research topics, this is apparently the only one including competences on nutrition.

### Recommendations

It is recommended that, from the start of the new contract, the management of the unit (board of directors and strategic committee) focuses on the interactions between the different teams, and on how their diverse expertise and knowledge will be optimally integrated and exploited. Ideally this interaction should be promoted at all levels, i.e. from the PhD students to the leaders of the teams.

To avoid thematic dispersion within the teams it is also recommended that a prospective re-evaluation of the different research themes be initiated within the new working frame of the unit. Identifying and merging around the strongest topics, while abandoning the less productive ones, will leverage the overall performance of the new unit.

The study of the alterations and the role of the microbiome in different pathophysiological conditions constitute one of the three transversal topics. This will ask a lot from the team with expertise in microbiology (CIMIAD). It would be advisable to reinforce the capabilities of these experts with additional human and material resources.

It would be interesting to devise strategies, including intramural funding, to support the emergence of new teams.

Actions to address data traceability, research quality and ethics should be addressed by the unit.

The strategies to analyse the microbiota have to be discussed and standardized, the development/use of metagenomic tools, bioinformatics and biostatistics should be an asset for the all unit.

The two sites location is a real weakness especially for the INRA team. Strategies and vigilance have to be taken to face the risks of isolation of the team.