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## UFIP - Unité de fonctionnalité et ingénierie des protéines

Rapport Hcéres

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# HCERES

High Council for the Evaluation of Research  
and Higher Education

Research units

HCERES report on research unit:

Protein Functionality and Engineering

UFIP

Under the supervision of  
the following institutions  
and research bodies:

Université de Nantes

Centre National de la Recherche Scientifique - CNRS

# 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>*

Patrice Soumillion, chairman of the  
committee

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Under the decree N<sup>o</sup>.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:** Protein Functionality and Engineering

**Unit acronym:** UFIP

**Label requested:** UMR

**Current number:** 6286

**Name of Director  
(2015-2016):** Mr Charles TELLIER

**Name of Project Leader  
(2017-2021):** Mr Bernard OFFMANN

## Expert committee members

**Chair:** Mr PATRICE SOUMILLION, Institute of Life Sciences, Louvain-la-Neuve, Belgium

**Experts:** Mr Ali HAMICHE, Institut de Génétique et de Biologie Moléculaire et Cellulaire, Strasbourg

Ms Gaëlle LEGUBE, Université Paul Sabatier, Toulouse

Mr Thierry MAUGARD, Littoral Environnement Sociétés, Université de la Rochelle

Ms Véronique TREZEGUET, CBMN, Université de Bordeaux (representative of CoCNRS)

**Scientific delegate representing the HCERES:**

Mr Pierre COUBLE

**Representatives of supervising institutions and bodies:**

Mr Frédéric BENHAMOU, Université de Nantes

Mr Bruno MIROUX, CNRS

**Head of Doctoral School :**

Mr Laurent LESCAUDRON, Doctoral school n° 502, "Biologie Santé"

## 1 • Introduction

### History and geographical location of the unit

The unit (initially UMR 6204, now UMR 6286) was created in 2004 at the University of Nantes with the name “Biotechnologie, Biocatalyse et Biorégulation” gathering all the teachers in biochemistry and biology of the university. The unit comprised individual teams located in three different buildings and a common technological platform in molecular interaction and protein array (IMPACT). Following an AERES evaluation in 2011, an effort of reorganization and contraction of the unit was recommended. In 2012, a new management team was in place and the name was changed to “Fonctionnalité et Ingénierie des Protéines” (UFIP). UFIP was created as the CNRS Formation de Recherche en Evolution (FRE) 3478 on January 1<sup>st</sup>, 2012 for 2 years. Following a positive evaluation by a CNRS committee, the unit became UMR 6286 on January 1<sup>st</sup>, 2014. The unit is now organized into four teams and one platform, around two themes: “Functionality and regulation of proteins” and “Engineering and evolution of proteins”. UFIP is also a member of the Federative Research Structure François Bonamy (FED 4203 / UMS 016 INSERM / CNRS 3556) gathering research units in Health and Biology from the University of Nantes and coordinating technological platforms.

The UFIP unit, whose staff is highly involved in teaching biological, biochemical and computational sciences, is located on the Science campus of the University of Nantes, close to the chemistry and computer science departments.

### Management team

Director: Mr Charles TELLIER

Deputy director: Mr Christophe THIRIET

For the next 5-year period, the UFIP unit will be chaired by Mr Bernard OFFMANN succeeding to Mr Charles TELLIER. Mr Bernard OFFMANN will be assisted by Mr Cyrille GRANDJEAN as deputy director.

### HCERES nomenclature

SVE1\_LS1 Biologie moléculaire, Biologie structurale, Biochimie

ST4 Chimie

### Scientific domains

Protein structure/function relationship, protein engineering, post-translational modifications, structural bioinformatics, cellular biochemistry, epigenetics, glyco-chemistry, DNA repair.

## Unit workforce

Unit workforce	Number on 30/06/2015	Number on 01/01/2017
N1: Permanent professors and similar positions	16	15
N2: Permanent researchers from Institutions and similar positions	4	3
N3: Other permanent staff (technicians and administrative personnel)	15	15
N4: Other professors (Emeritus Professor, on-contract Professor, etc.)	1	
N5: Other researchers from Institutions (Emeritus Research Director, Postdoctoral students, visitors, etc.)	2	
N6: Other contractual staff (technicians and administrative personnel)	1	
N7: PhD students	11	
<b>TOTAL N1 to N7</b>	<b>50</b>	
Qualified research supervisors (HDR) or similar positions	11	

Unit record	From 01/01/2010 to 30/06/2015
PhD theses defended	6
Postdoctoral scientists having spent at least 12 months in the unit	18
Number of Research Supervisor Qualifications (HDR) obtained during the period	3

## 2 • Overall assessment of the unit

### Introduction

The unit was founded in 2004 around the so-called 3 Bs, Biotechnology, Biocatalysis and Bioregulation, with a strong emphasis on protein science. Following the AERES evaluation in 2011, the scientific policy evolved to a more focused definition, which is to tackle biological questions that are related to protein function and engineering. Through molecular and cellular approaches, the UFIP unit aims at investigating protein function in relation to their interactions and post-translational modifications, but also at designing and studying engineered proteins that are obtained after mutagenesis. A strong asset of the unit is the complementarity of expertise in chemistry and biology. To reinforce the focusing on protein structure and function, and to further develop multidisciplinary, the unit increased its *in silico* expertise by creating in 2012, through staff recruitment, a specific team, the objectives of which are to interact with the other teams but also to develop its own original research approaches in bioinformatics. In another team, experimental embryology research projects were arrested, reducing projects dispersion and focusing

research on investigating protein function. Nowadays, UFIP comprises 4 teams and a technical platform gathering shared equipment. Specific grants taken from the unit budget are available for supporting inter-team projects.

The UFIP life is tightly associated with the sciences teaching of the University of Nantes, with 16 university faculties amongst its members, justifying the unit's localization on the Science campus.

### Global assessment of the unit

With 4 teams, and a staff around 40-50 permanents and non-permanents, UFIP is a medium sized research entity. Its annual operating budget is around 600 k€. The teams are organized around two axes: "protein engineering and evolution" using computational and molecular approaches (teams 1 and 2) and "protein function and regulation" using mainly cellular approaches (teams 3 and 4). Several research projects developed in the unit are innovative and could lead to important scientific contributions in the future. The balance between basic and applied projects seems adequate.

Since 2011, the UFIP unit has improved its scientific policy, mainly by focusing projects and developing/encouraging intra-unit collaborations. The unit's capacity to recruit talented permanent staff during the past 5 years is an indicator of its national attractiveness. In this regard, the complementarity of expertise in biology, chemistry and bioinformatics is a strong asset. Such a multidisciplinary contributes to the brand reputation of the unit. This interfacial situation also justifies the size of UFIP and makes it a strategically important and appreciated regional partner. UFIP is acting as a cohesive entity between much bigger neighbouring structures such as the Health Pole and the chemistry department. The unit is also well anchored in the regional socio-economic network, being involved in several training programs of the university and interacting with many industrial and regional partners. Finally, many permanent researchers of UFIP are involved in scientific collaborations both at the national and international level.

### Strengths and opportunities in the context

The complementarity of approaches and expertise (biology, chemistry and bioinformatics) is an asset for developing innovative and multidisciplinary research projects. Not being dependant of the Health Pole allows working in specific niches of biological sciences.

### Weaknesses and threats in the context

Though the small size of the unit is an asset for developing multidisciplinary approaches (as it facilitates interactions between unit members), it is a threat for its visibility and attractiveness, especially at the international level. Also, the high involvement in teaching and training activities is limiting the research capacity, implying a more critical need to find research niches without too much international competition. The number of PhDs and post-docs is still low. Another limitation lies in the non-involvement of UFIP in European research programs.

### Recommendations

The committee recommends that UFIP focus its research on relevant and original biological questions (starting a project only if a high impact is expected), which should improve scientific quality and outputs. Increasing scientific communications within the unit should help in this regard.

The unit should develop strategies for attracting a higher number of talented PhDs and post-doctoral scientists and for joining or initiating H2020 European programs (such as training networks). The unit should also push forward the effort for developing inter-team collaborative projects, especially in the combination of molecular and cellular approaches.

Teams 3 and 4 should try to federate their strengths and knowhow, and try to collaborate for the development of research projects based on clearly identified fundamental biological questions that are not directly related to health issues. In this regard, expanding the use of the very interesting *Physarum* model system developed by team 4 for addressing questions related to DNA repair (team 3) should be envisioned. Moreover, the spontaneous internalization of exogenous proteins is a *Physarum* characteristic that can be a unique opportunity for developing innovative projects in chemical biology and which could involve the more "molecular" teams 1 and 2.

The multidisciplinary approach of UFIP is a strength, and in this context, team 3 and 4 are critical since both develop more cellular approaches. However, the unit should make sure that those teams work in the best conditions and give a particular care in acquiring the equipment required for their research (for example a cell sorter).

A more rhythmic or systematic scientific animation is maybe missing (such as a annual UFIP day and/or weekly/monthly seminars by invited guests). Scientific animation may also be improved around a convivial cafeteria.

Importantly, the future deputy head of the unit will take over the direction of the biggest UFIP team. This may be particularly challenging (management of some projects not initiated by the new team leader and not in his field of expertise, international visibility and fund raising). Hence, the unit should be particularly vigilant to ensure that the transition is as smooth as possible. In that regard, entrusting him with the additional function of deputy director of the UFIP may not be judicious. Moreover, since the new director will be Mr Bernard OFFMANN, a deputy director from the “cellular” teams may be more appropriate for a good balance of the experimental approaches at the UFIP’s head.

An external advisory-support by the CNRS and/or by scientific mentors may be required to reach the objectives of the five-year plan and to improve the international visibility. In accordance with the unit’s wish, establishing a scientific advisory board (SAB) is recommended by the committee, although a particular attention to the choice of foreign members will be required.