ARNA - Acides nucléiques : régulations naturelles et artificielles

Rapport Hcéres

HCERES

High Council for the Evaluation of Research and Higher Education

Research units

HCERES report on interdisciplinary unit:

Nucleic Acids: Natural and Artificial Regulation

ARNA

Under the supervision of the following institutions and research bodies:

Université de Bordeaux

Centre National de la Recherche Scientifique – CNRS

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

Evaluation Campaign 2014-2015 (Group A)

HCERES

High Council for the Evaluation of Research and Higher Education

Research units

In the name of HCERES,[1]

Didier HOUSSIN, president

In the name of the experts committee,[2]

Pascale ROMBY, chairman of the committee

Under the decree N°.2014-1365 dated 14 november 2014,

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

[2] 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:	Nucleic Acids: Natural and Artificial Regulation
Unit acronym:	ARNA
Label requested:	Inserm, university and CNRS
Present no.:	U 869
Name of Director (2014-2015):	Mr Jean-Louis MERGNY
Name of Project Leader (2016-2020):	Mr Jean-Louis MERGNY

Expert committee members

Chair:

Ms Pascale ROMBY, IBMC, CNRS, University of Strasbourg

Experts:

Mr Jean-Marie AUBRY, Université de Lille 1, Villeneuve d'Ascq (representative of the CNU)

Mr Christophe BIOT, Université Lille 1, CNRS, Villeneuve d'Ascq (representative of the CoNRS)

Mr Vincent DIVE, CEA, Gif-sur-Yvette (representative of the Inserm)

Mr Michal HOCEK, IOCB, Academy of Sciences, Prague, Czech Republic

Mr Patrick SCHULTZ, IGBMC, CNRS, INSERM, University of Strasbourg, Illkirch Graffenstaden

Mr Georg SCZAKIEL, IMM, University of Lübeck, Germany

Scientific delegate representing the HCERES:

Mr Georges MASSIOT

Representatives of the unit's supervising institutions and bodies:

Ms Gaëlle BUJAN, CNRS

Mr Pierre DOS SANTOS, Bordeaux University

Mr Philippe LECONTE, Inserm

Mr Roger MARTHAN (representative of the Doctoral School n°154 "Life Sciences and Health")

Ms Stéphanie POMMIER, Inserm

Mr Thierry TOUPANCE (representative of the Doctoral School n°040 "Chemistry")

1 • Introduction

History and geographical location of the unit

The ARNA laboratory is a Inserm unit (U 869) associated with the University of Bordeaux. ARNA unit has been created in January 2007 and was initially led by Mr Jean-Jacques TOULMÉ until 2010. Mr Jean-Louis MERGNY took the leadership of the Inserm unit in january 2011. The general goal of the unit is to create a specific environment for interdisciplinary projects covering chemistry, physical chemistry and biology dedicated to basic and applied research on nucleic acids. The ARNA unit is tightly linked to the *Institut Européen de Chimie et de Biologie* (IECB, executive scientific director Mr Jean-Jacques TOULMÉ), which is an international and interdisciplinary research team incubator supported by CNRS, Inserm and the University of Bordeaux. IECB also hosts support services, a company and a technology transfer unit Novaptech, as well as technology platforms that are controlled by the UMS 3033/US 001 (executive scientific director Mr Jean-Louis MERGNY). The teams of the ARNA laboratory are located at two different sites, the Carriere campus of the university (Bordeaux) and IECB (Pessac). In the future project, the ARNA laboratory will integrate two other units specialized in organic chemistry, pharmacochemistry and analytical chemistry but the overall project will not change. With the creation of the unique University of Bordeaux in January 2014, ARNA unit became a major component of the "Health and Life Sciences" (SVS) research department of the University of Bordeaux, and will be a member of the federation TecSan "Technologies for Health" of the SVS department.

Management team

Director and project leader: Mr Jean-Louis MERGNY

The research groups (12) of ARNA (U 869, Inserm) will be organized into five federative teams: Molecular and supramolecular systems for therapeutic applications (ChemBioPharm); Functional oligonucleotides and structured nucleic acids (OLIFANS); Transcription, Maturation and Structures (TMS); Small RNAs, translation and aptamer (STRAMES); Mass spectrometry for nucleic acids biophysics (BiophyMS). Each team will be under the supervision of a group leader, including the head of unit. The management of the unit is collegial and consensual creating a stimulating and excellent atmosphere.

HCERES nomenclature

SVE1_LS1, SVE2_LS9, SVE1_LS2, ST4

Unit workforce

Unit workforce	Number as at 30/06/2014	Number as at 01/01/2016
N1: Permanent professors and similar positions	11	19
N2: Permanent researchers from Institutions and similar positions	11	14
N3: Other permanent staff (without research duties)	11	13
N4: Other professors (Emeritus Professor, on-contract Professor, etc.)		
N5: Other researchers (Emeritus Research Director, Postdoctoral students, visitors, etc.)	22	27
N6: Other contractual staff (without research duties)	2.5	2.5
TOTAL N1 to N6	**57.5**	**75.5**

Unit workforce	Number as at 30/06/2014	Number as at 01/01/2016
Doctoral students	17	
Theses defended	21	
Postdoctoral students having spent at least 12 months in the unit	12	
Number of Research Supervisor Qualifications (HDR) taken	3	
Qualified research supervisors (with an HDR) or similar positions	13	22

2 • Overall assessment of the interdisciplinary unit

Global assessment of the unit

ARNA is a multidisciplinary unit at the interface of the chemistry, physical chemistry and biology that has an excellent visibility at both the national and international levels. Overall, the productivity of the research teams is excellent. The scientific policy of the unit shows a strong internal coherence in the developed scientific themes with a continuum from basic to applied research focusing on nucleic acids and gene regulation. ARNA organization facilitates the development of internal collaborative projects between the research groups with complementary expertise. International collaborations have been established in all teams. All research groups were successful in ANR funding and benefit from the IECB structure to attract outstanding young group leaders awarded with national and European starting grants. ARNA scientists participate actively in teaching and training action at the University of Bordeaux in chemistry, molecular biology and genetics. The unit is a major component of the "Health and Life Sciences" (SVS) research department of the University of Bordeaux and will participate in several transversal actions such as regenerative medicine and synthetic biology. Although the groups benefit from platforms of IECB, the technical support for several teams is clearly insufficient. ARNA unit is a key player in technology transfer with strong potential for applications in biotechnology and in health. Overall, ARNA is an excellent multidisciplinary unit.

Strengths and opportunities in relation to the context

Research groups from ARNA have access to and have developed innovative and cutting-edge technologies present in the unit or at the IECB. ARNA also benefits from the IECB organization for the recruitment of outstanding international young research groups. ARNA gathers experts from various disciplines creating a positive environment to facilitate internal and transversal joint projects centered on nucleic acids and gene regulation, and for technology transfer with potential applications to human diseases and health.

Several team members of ARNA are deeply involved in teaching in biology and genetics and new programs have been initiated to provide chemistry background for biologists. The recruitment of several post-doctoral fellows, participation to Marie Curie grants (ITN), recruitment of international teams, invitation to international meetings, are positive signs for the international recognition of ARNA.

The research unit has very strong forward momentum based on successful fundings, the recruitment of outstanding young teams and the leadership of the director. During the visit to the unit, it became evident to the experts committee that the smooth transition of the direction of ARNA during the period of the evaluation, and the present director had major roles in the renewal and invigoration of the ARNA unit.

The collegiality and the excellent spirit with the ARNA unit have been obvious during the visit as has been the high degree of motivation of all team members at all levels, which is considered as a clear strength of the unit and of its structure.

The biological systems and topics of the ARNA unit, the reinforcement of chemistry and molecular biophysics, and the development of innovative methods would fully deserve a dual recognition from INSERM and CNRS (Institute of Chemistry) to support the future of this highly promising unit.

Weaknesses and threats related to the context

ARNA will significantly increase the size of the unit and will face a major challenge, which is the integration of one CNRS unit and one relatively large team affiliated to the university. The integration of the CNRS chemistry unit into the OLIFANS team is effective and the experts committee feels that reinforced communication will in the long run bring an added value to the existing team. For the university unit, the experts committee acknowledges the acquisition of new expertise (analytical chemistry, pharmacochemistry), but the success of this new integration will require a major effort of the reorientation of the researchers to apply their know-how to the CHEMBIOPHARM's project, to enhance their scientific production and quality, and their international visibility.

Caution is required to maintain the international competitivity of some of the research groups with limited size.

The various research groups are scattered over several places, IECB and in two different buildings at the University Campus in Carreire, which is not ideal to facilitate interactions and scientific discussions. However, monthly seminars including all researchers, post-doctoral fellows, PhD students, engineers and technicians, and the fact that the ARNA director is also part of the executive scientific direction of IECB, should impact positively the evolution of the ARNA projects. One of the objectives of the University of Bordeaux is the construction of a novel center at Carriere, planned in 2020, that would include the various ARNA teams.

Recommendations

The experts committee recommends that ARNA should have a specific Scientific Advisory Board whose role would be to monitor the progress of the scientific projects of the ARNA teams, i.e. especially of the two newly incoming chemistry groups.

The ARNA unit would benefit from the recruitment of team or researchers with expertise in molecular modeling and molecular dynamics.

Because each research group within a team is completely independent in term of research and funding, the experts committee feels that a minimal workforce in some of the groups should be ensured, i.e. providing technical support for emerging groups. The collegial management of the unit should be reinforced to maintain cohesion and collaborations between the research groups, to recruit new outstanding teams, and to ensure that the IECB science policies impact positively the ARNA projects.

The high level of collaboration between groups of the unit should be maintained. The experts committee encourages the director to take a small overhead from the grants in order to facilitate the emergence of transversal collaborative projects and favor their maturation for an ANR application, and to reinforce the communication between chemists and biologists so that innovative chemistry can be developed to solve fundamental biological questions.

ARNA projects require specific knowledge and skills in physico-chemistry. Therefore, the affiliation of several ARNA teams to the Doctoral Chemistry School will be essential for recruting outstanding PhD students.

Although the teams have been successful in obtaining funding coming mainly from ANR, the most competitive research groups should apply to EU fundings and to international ANR grants.

Organizing international conferences would help to enhance the visibility of the multidisciplinary ARNA unit at the international level.

Although several teams have been successful in technology transfert, more efforts should be made in getting returns and revenues from patent licensing.