IMoST - Imagerie moléculaire et stratégies théranostiques

Rapport Hcéres

HCERES

High Council for the Evaluation of Research
and Higher Education

Research units

HCERES report on research unit:

Imagerie Moléculaire et Stratégies Théranostiques

IMoST

Under the supervision of the following institutions and research bodies:

Université d'Auvergne - UDA

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

Université Blaise Pascal – UBP

Evaluation Campaign 2015-2016 (Group B)

HCERES

High Council for the Evaluation of Research and Higher Education

Research units

In the name of HCERES,[1]

Michel COSNARD, president

In the name of the experts committee,[2]

Uwe HABERKORN, chairman of the committee

Under the decree No.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 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:	Imagerie Moléculaire et Stratégies Théranostiques
Unit acronym:	IMoST
Label requested:	UMR
Current number:	990
Name of Director (2015-2016):	Mr Jean-Michel CHEZAL
Name of Project Leader (2017-2021):	Ms Elizabeth MIOT-NOIRAULT

Expert committee members

Chair:	Mr Uwe HABERKORN, Université d'Heidelberg, Allemagne
Experts:	Mr Eric BENOIST, Université Paul Sabatier, Toulouse
	Mr Sylvain BOHIC, ESRF, Grenoble (representative of CSS)
	Ms Janet HALL, Inserm, CRCL, Lyon
	Mr Olivier MUNDLER, Université de Marseille (representative of CNU)
	Ms Myriam POLETTE, Université de Reims-Champagne Ardenne
	Mr Jean-Yves SCOAZEC, Institut Gustave Roussy, Villejuif
Scientific delegate representing the HCERES:	Mr Georges MASSIOT
Representatives of supervising institutions and bodies:	Mr Jean CHAZAL, Faculty of Medecine
	Mr Vianney DEQUIEDT, CERDI
	Mr Alain ESCHALIER, Université d'Auvergne

Ms Marie Josèphe LEROY ZAMIA, Inserm

Ms Pascale SAULNIER, Inserm

Heads of Doctoral Schools:

Mr Jean Marc LOBACCARO, Doctoral School n° 65 “Sciences de la vie, santé, agronomie, environnement”

Mr Patrice MALFRET, Doctoral School n° 178 “Sciences fondamentales”

1 • Introduction

History and geographical location of the unit

The IMoST project results from the fusion of 3 research units: UMR 990 (Molecular Imaging and Targeted Therapy), ERTICa and CREaT. Historically, UMR 990 originates from INSERM 71, created in 1969, which became UMR 90 (in January 2010 – Inserm, Université d'Auvergne) which was subsequently renewed in 2012. It belongs to ITMO TS (technologies pour la santé) and is part of canceropôle CLARA (INCa). ERTICa was established in 2012 by the fusion of 2 UMRs and 3 EAs and located in the Centre Jean Perrin. CREaT was localized in the Centre Jean Perrin, Gabriel Montpied University Hospital and the Estaing University Hospital.

These three units have been engaged in collaborative projects already for many years, making it reasonable to establish a common research structure to strengthen the scientific exchange and output. Recently, the Inserm building in which they will be located has been entirely remodelled (Sept. 2015), with dedicated and access-controlled areas for analytical chemistry, organic chemistry, radiochemistry, cell culture (upgraded to L2), animal housing (A1 level) and *in vivo* imaging facilities. The geographical location of the unit, close to the Jean Perrin Centre and the Faculty of Medicine, should facilitate the development of their projects, from bench to bedside.

Management team

The director of UMR 990 was Mr Jean-Michel CHEZAL since 2008. ERTICa was headed by Ms Frédérique PENAULT-LLORCA and CREaT by Mr Pierre VERRELLE.

Beginning in 2017 the new IMoST unit will be directed by Ms Elizabeth MIOT-NOIRAULT (team leader in UMR 990) with Ms Frédérique PENAULT-LLORCA (leader of ERTICa) as deputy director. Both are experienced scientists with a high reputation in their fields of research, and Ms Frédérique PENAULT-LLORCA is also director of Centre Jean Perrin.

HCERES nomenclature

SVE1_LS7 Epidémiologie, santé publique, recherche clinique, technologies biomédicales

SVE1_LS3 Biologie cellulaire, Biologie du développement animal

SVE1_LS2 Génétique, génomique, bioinformatique

ST4 Chimie

Scientific domains

The unit is concerned with the development, preclinical evaluation and the clinical translation of targeting tools for theranostic strategies, in particular radiopharmaceuticals. In addition, the fusion will bring new expertise on triple negative breast cancer (TNBC) and on genetic instability in hereditary breast cancer.

Unit workforce

The data concerning the workforce of the 3 teams UMR990, ERTICa and CREaT are listed in section 4 (team by team analysis).

Unit workforce	Number on 30/06/2015	Number on 01/01/2017
N1: Permanent professors and similar positions	22	38 (12.98)
N2: Permanent researchers from Institutions and similar positions	1	8
N3: Other permanent staff (technicians and administrative personnel)	9	27 (18.7)
N4: Other professors (Emeritus Professor, on-contract Professor, etc.)	5	
N5: Other researchers from Institutions (Emeritus Research Director, Postdoctoral students, visitors, etc.)	4	
N6: Other contractual staff (technicians and administrative personnel)	3	
N7: PhD students	10	
TOTAL N1 to N7	**54**	
Qualified research supervisors (HDR) or similar positions	16	

Unit record	From 01/01/2010 to 30/06/2015
PhD theses defended	11
Postdoctoral scientists having spent at least 12 months in the unit	17
Number of Research Supervisor Qualifications (HDR) obtained during the period	2

2 • Overall assessment of the unit

Introduction

IMoST will consist of two teams:

- Team 1 deals with targets and tools for imaging and therapy. This includes the design and synthesis of targeted-molecules for imaging and for targeted therapies, the characterization of biomarkers identified by team 2, and preclinical validation/proof of concept studies of these biomarkers;
- Team 2 is concerned with translational research in functional imaging, radiopharmaceuticals and theranostic biomarkers.

The topics of this group are respectively, the translational validation of new radiotracers and the screening of biomarkers from patient biopsies to identify new targets for team 1, and the assessment of the additive value of functional imaging, radiopharmaceuticals and biomarkers for the stratification of patients.

Since this is a new unit created via the fusion of three groups, UMR990, CREaT and ERTICa, a comparison with a previous evaluation is not possible. The previous activities of the three teams prior to the fusion will be discussed separately.

Global assessment of the unit

The three teams involved in the IMoST project have, in the past, focused on distinct topics: imaging and therapy of melanoma and cartilage (U 990), triple negative breast cancer (ERTICa) and glioma and chronic lymphocytic leukemia (CREaT). Such focus, involving strong collaborations and a strong emphasis on multi-disciplinarity, enabled each team to create a scientific 'highway' stretching from basic studies and development to preclinical validation/proof of concept and, in some instances, to clinical applications. In addition, by concentrating on selected tumour entities, they were able to generate a deeper knowledge of the biochemical and molecular bases of the disease that allowed the design of new pharmaceuticals and/or new combined treatments. The merger of the three teams and the decision to concentrate on those subjects where the expertise is greatest are the next and logical steps to continue with this research strategy. The multidisciplinary structure of the two new proposed teams and the availability of high technology platforms enable the team to gain insights into the molecular changes in tumour cells or surrounding stroma. Furthermore, it makes drug development and to diagnostic and therapeutic applications in patients easier. The scientific staff has a good potential for generating high impact publications and patents based on their research, but they must not over-disperse themselves and must maintain a critical mass in the research areas in which they are recognized experts.

Strengths and opportunities in the context

The new unit brings together specialists of different and complementary disciplines, which creates an ideal scientific environment for basic research, drug development and rapid translation into clinical application.

The renovated main building (Inserm), where the majority of the staff will be located, offers a very good working space for the different groups and will enhance the interactions between staff.

The technology equipment can be considered to be at a high level, offering many options for preclinical and clinical activities.

The establishment of complementary technology platforms makes life easier for scientists engaged in multidisciplinary projects.

The focus on selected tumour entities such as breast cancer, melanoma and chondrosarcoma is a prerequisite for high-level research.

The experience in applying for grants and patents, and in disseminating and publishing results of all members of the fused unit makes it likely that the unit will get more funding in the future.

Weaknesses and threats in the context

The unit members are not represented adequately in the scientific committees of French institutions such as CNU, ANR and Inserm.

There is a low amount of funding from European or international sources.

There is a lack of post-doctoral fellows.

There is a lack of scientific recognition of UMR 990 with respect to their achievements in molecular imaging.

There are too few Inserm staff and full-time scientists – many staff having clinical or teaching duties.

Recommendations

The committee finds that the strongest and most innovative and, therefore, the highest priority, areas of research for the future are those related to chemo/radio-resistance of triple negative breast cancer, and melanoma and cartilage-affinity molecules for imaging and therapy: clearly team 1 has the potential to develop innovative new molecules as they have done for chondrosarcoma; this can be achieved once biotargets have been identified by team 2.

The committee would like to encourage the unit to develop more international collaborations and apply more actively to EC-funded collaborative projects (FP7, H2020, Marie Curie or Cost network). The unit should build on its close links with the two Doctoral Schools to recruit more students, and actively develop, together with international collaborators, the possibility of postdoctoral exchange programs (Marie Curie fellowships).

The committee also encourages members of the unit to participate in scientific and/or editorial boards, not only at the national level but also at the European and international levels, and actively encourages participation to international symposia, in order to draw attention to the unit's achievements and enhance its international reputation: this would also help the recruitment of postdoctoral fellows and full-time junior scientists, which is crucial to pursue ambitious scientific projects.

The committee recommends that the management team re-evaluates the current plans for the next five years, taking into account the comments contained in the review, in particular the fact that the number and complexity of projects should be in adequacy with both human and funding resources. The committee recommends that the management team should call on the advice of an external scientific advisory board in order to carry out this re-evaluation. The committee feels that a critical mass of scientists, with the necessary expertise and allocated time and funding, is not reached for all the proposed research projects, and, therefore, that it will not be possible to be competitive at the international level for grant application or for timely publication of results in high impact journals in these areas. This will reduce the attractiveness and scientific production of the unit. It is thus essential that the choice of research fields of individual scientists be carefully evaluated so that these criteria are met and that dispersion is avoided.

The unit has access to several high quality platforms and needs to develop a clear strategy for maintaining and renewing the equipments.