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GReD - Génétique reproduction et développement

Rapport Hcéres

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HCERES

High Council for the Evaluation of Research
and Higher Education

Research units

HCERES report on research unit:

Genetics Reproduction and Development
GReD

Under the supervision of
the following institutions
and research bodies:

Université d'Auvergne - UDA

Centre National de la Recherche Scientifique - CNRS

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

Université Blaise Pascal - UBP

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

Terry Magnuson, chairman of the committee

Under the decree N^o.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:	Genetics Reproduction and Development
Unit acronym:	GReD
Label requested:	Inserm unit, UMR CNRS/University
Current number:	U1103 and UMR6293
Name of Director (2015-2016):	Ms Chantal VAURY
Name of Project Leader (2017-2021):	Ms Chantal VAURY

Expert committee members

Chair:	Mr Terry MAGNUSON, Genetic Medicine, Chapel Hill, USA
Experts:	Ms Marie-Christine CHABOISSIER, Institut de Biologie Valrose, Nice (representative of the Inserm CSS) Mr Thierry DARRIBERE, Laboratoire de Biologie du Développement, Paris (representative of the CNU) Mr Marc DELPECH, Hôpital Cochin, Paris Ms Claire FRANCASTEL, Université Paris-Diderot, Paris Mr François KARCH, University of Geneva, Switzerland Mr Antonio MOSCHETTA, University of Bari, Italy Mr Holger PUCHTA, Karlsruhe Institute of Technology, Germany Mr Frédéric RELAIX, Faculté de Médecine Pitié-Salpêtrière, Paris Mr Daniel VAIMAN, Institut Cochin, Paris (representative of the CoCNRS) Mr Lucas WALTZER, Centre de Biologie du Développement, Toulouse
Scientific delegate representing the HCERES:	Mr Pierre COUBLE

Representatives of supervising institutions and bodies:

Mr Jean-Maurice DURA, CNRS

Mr Alain ESCHALIER, University of Auvergne

Mr Thierry GALLI, INSERM

Mr Pierre HENRARD, University Blaise Pascal

Ms Chantal LASSERRE, INSERM

Head of Doctoral School:

Mr Jean-Marc LOBACCARO, Doctoral school n° 65, “Life Science, Health, Agronomy and Environment”

1 • Introduction

History and geographical location of the unit

The Genetics Reproduction and Development (GReD) laboratory was founded in 2008 under the joint sponsorship of the Université Blaise Pascal and the Université d'Auvergne with support from the region Auvergne, the Centre National de la Recherche Scientifique (CNRS) and the Institut National de la Santé de la Recherche Médicale (INSERM). The GReD is a major biosciences research unit in Clermont-Ferrand with a focus on understanding the genetic and epigenetic programs underlying development, reproduction and abnormal, diseased states. When created, the laboratory consisted of 13 research teams of which 7 still exist. Since the last external review in 2011, three new research teams were added resulting in a total of 10 research teams for the unit. The research of the GReD teams are aligned along three axes: (1) Genome Dynamics and Epigenetic Control (four teams); (2) Reproduction and Development in Health and Disease (four teams); (3) Endocrinology, Signalling and Cancer (two teams). The GReD researchers have expertise in plants, fungi, invertebrates such as *Drosophila*, and mammals including mouse and human. The unit is located at two separate sites ~3 km apart: the Faculty of Medicine of Clermont-Ferrand and the Cézeaux University campus. However, an important change will occur in 2017 when all research teams of the GReD will move to a new building, the Center for Clinical and Biological Research (CCBR), located on the medical campus.

Management team

The GReD director is Ms Chantal VAURY and the deputy-director Mr Jöel DREVET.

HCERES nomenclature

Principal: SVE1_LS3

Secondary: SVE1_LS4, SVE1_LS2 and SVE2_LS3

Scientific domains

Dynamics of genome - plasticity - normal and pathological development - reproduction - molecular endocrinology.

Unit workforce

Unit workforce	Number on 30/06/2015	Number on 01/01/2017
N1: Permanent professors and similar positions	32	45
N2: Permanent researchers from Institutions and similar positions	17	19
N3: Other permanent staff (technicians and administrative personnel)	23	24
N4: Other professors (Emeritus Professor, on-contract Professor, etc.)		
N5: Other researchers from Institutions (Emeritus Research Director, Postdoctoral students, visitors, etc.)	23	
N6: Other contractual staff (technicians and administrative personnel)	3	
N7: PhD students	29	
TOTAL N1 to N7	127	
Qualified research supervisors (HDR) or similar positions	28	

Unit record	From 01/01/2010 to 30/06/2015
PhD theses defended	32
Postdoctoral scientists having spent at least 12 months in the unit	29
Number of Research Supervisor Qualifications (HDR) obtained during the period	13

2 • Overall assessment of the unit

Introduction

The GReD has focused research efforts on understanding basic biological mechanisms occurring at the genome and cell levels using diverse model organisms. The thematic areas represented by the three research axes (Genome Dynamics and Epigenetic Control, Reproduction and Development in Health and Disease, Endocrinology, Signaling and Cancer) will continue during the next five years (2017-2012). The GReD is placing a stronger emphasis on translational research by adding the team of Mr Vincent SAPIN, which is focused on epithelial injury and repair. Also, the addition of the new team of Mr David VOLLE focused on infertility, which spun out of the Mr Jean-Marc LOBACCARO team, is an effort to strengthen the translational aspect of the unit. Six of the GReD teams will be co-directed by a group leader and a younger associate leader. The rationale is that co-led teams serve as a mechanism to mentor younger researchers who eventually could become team leaders.

Global assessment of the unit

The GReD research projects cover diverse scientific questions aimed at understanding genome integrity, regulation of gene expression, cell and tissue differentiation and organismal development. Research productivity has increased during the last four years as evidenced by a 30% increase in research expenditures due to success in obtaining both national and international grants. The interactions and technical cross training between the teams, as well as the development of cutting-edge platforms, provide an exciting environment for GReD researchers. Examples of significant research findings during the last four years include (i) intronic DNA methylation in transcriptional control of the *IBM1* gene, (ii) description of histone modifications at imprinting control regions, (iii) the *flam* piRNA cluster in *Drosophila*, (iv) the link between small RNAs and repair of chromosome breaks, (v) demonstrating essential roles of *Nanog* and *Gata6* during early differentiation, (vi) finding genes that sensitize mice to a high cholesterol diet, (vii) abnormal activation of WNT signalling triggering adrenal tumorigenesis, (viii) understanding the role of bile acids in pathophysiology of the testis, (ix) histone chaperone complexes maintaining nucleosome occupancy at genes.

Strengths and opportunities in the context

The team leaders and members consist of INSERM and CNRS supported researchers as well as teacher/researchers supported by the universities. Because of their close connection with the universities, the GReD faculty play a major role in both master and Ph.D. training. Of note are the increasing interactions with the medical school and hospital for translational programs. GReD members are active participants in national review committees such as CNRS, INSERM and Institute de Recherche pour le Développement (IRD), as well as members of French scientific societies, and local university committees. The GReD has increased its international visibility by members organizing and attending meetings. In addition, the number of publications has increased to 35-45 articles per year, with almost half being in journals rated as middle to top tier. Recognition and reputation of GReD researchers are also reflected in the increasing number of awards (e.g. ERC starting grant, ATIP/Avenir, two CNRS bronze medals, and one Fondation pour la Recherche Médicale (FRM) team). The unit has an impressive record of recruiting eight young researchers during the last five years, which adds important vitality to the scientific environment. A significant strength of the GReD are the technology platforms established by the research teams that are available to all researchers of the unit as well as to researchers outside the unit. In addition, GReD researchers have access to additional technology provided by the university or other research units (bioinformatics, high throughput sequencing, cell sorting, integrated imaging, metabolomics, proteomics). The move of all research teams into the new CCBR building will have a significant positive effect on research interactions and the possibility of initiating more interdisciplinary projects.

Weaknesses and threats in the context

Despite success in increasing support, funding is a major limiting factor for the GReD achieving international pre-eminence as a research unit in their chosen scientific fields. The limited number of permanent positions, both at the faculty and technical level, is a significant problem for the GReD in future planning. For example, the unit will have space for additional teams in the new CCBR building but no support for funding and attracting new researchers. Also, many of the permanent technical staff (specifically engineers) are approaching retirement age and the GReD does not know whether these positions will be replaced. Post-doctoral training is also a significant issue for the GReD. Post-doctoral fellows are classified as temporary employees and theoretically can remain in their position for up to six years maximum. However, in practice it seems impossible for post-doctoral fellows to remain at the GReD longer than 3-4 years due to local, regional rules that are outside the control of GReD management. Given the complexity and demands on what is required to complete projects, 3-4 years is not enough time to produce competitive research papers. This enforced shortened post-doctoral training period is not good for the fellows and makes the GReD a much less attractive place to recruit the very best fellows. This limitation has and will continue to limit the GReD's international visibility if outstanding postdoctoral fellows are not allowed to complete their work and publish in premier journals. In addition to this problem, limited funding and the lack of sufficient permanent positions results in GReD research teams that are small compared to international research teams. This restricts their ability to compete at the highest level. Given the data intensive nature of research today, the GReD is also lacking sufficient internal bioinformatics support embedded within the science of the research teams. This slows progress while they wait for support from outside informatics groups or for support from shared informaticians. The merger of the region Auvergne, with the region Rhône Alpes and the merger of the University of Auvergne with the University Blaise Pascal represent unknowns regarding the impact on future support for the GReD, and this creates an environment of uncertainty.

Recommendations

The GReD needs to work closely with the newly merged regions and universities to (i) develop a reasonable budget plan for maintaining the unit, (ii) increase permanent funding to allow the unit to recruit three new team leaders once the building opens, and (iii) maintain, if not increase, the permanent support positions (technicians and engineers). The policy of establishing co-leaders for research teams (a senior and junior leader) is a good practice for mentoring junior researchers. However, the GReD leadership must not automatically assume that the junior leaders succeed senior leaders when they retire. This policy will result in a stagnant research environment and not allow for an assessment for the need for new research areas. It is recommended that, when a team leader retires, the GReD leadership confer with their Scientific Advisory Board to assess the research strengths of the unit and decide whether new thematic areas should replace existing focus areas. In addition, GReD leadership should be encouraged to conduct an open, competitive search for new team leaders. Bringing outside researchers provides new perspectives and possibilities for scientific evolution of the unit. The quality of publications has improved since the last evaluation; however, the output is still not high enough to elevate the GReD as one of the best research units - not only internationally - but also in France. Complex and rapidly evolving technology requires interdisciplinary teams to answer challenging questions. The competition is fierce and the time to publication is critical. Although interactions amongst GReD teams occur regarding the sharing of technology, there is little evidence of collaborations amongst research teams resulting in interdisciplinary publications. Given that GReD research teams are limited in size, and that post-doctoral fellows have a limited time in the lab, collaborations on focused questions could lead to more significant publications in a faster time frame and elevate the stature of the unit. GReD researchers need to continue to attend and speak at international meetings. Finally, more effort is needed to integrate newly added clinical team(s) into the rest of the unit. There is significant potential synergy that has not yet been achieved.