BGE - Biologie à grande échelle

Rapport Hcéres

HCERES

High Council for the Evaluation of Research and Higher Education

Research units

HCERES report on research unit:

Large-Scale Biology

BGE

Under the supervision of the following institutions and research bodies:

Université Joseph Fourier - Grenoble - UJF

Commissariat à l'Énergie Atomique et aux Énergies Alternatives - CEA

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

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In the name of HCERES,[1]

Didier HOUSSIN, president

In the name of the experts committee,[2]

Pascal BARBRY, 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 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:	Large-Scale Biology
Unit acronym:	BGE
Label requested:	UMR
Present no.:	UMR-S 1038
Name of Director (2014-2015):	Mr Jérôme GARIN
Name of Project Leader (2016-2020):	Mr Xavier GIDROL

Expert committee members

Chair:	Mr Pascal BARBRY, Institut de Pharmacologie Moléculaire et Cellulaire, Sophia Antipolis, Nice
Experts:	Mr Dominique FERRANDON, Institut de Biologie Moléculaire et Cellulaire, Strasbourg
	Mr Krzysztof JAGLA, Laboratoire de Génétique, Reproduction et Développement, Clermont-Ferrand
	Ms Maria MITEVA, Molécules Thérapeutiques in silico, Paris Expert (representative of the CSS INSERM)
	Mr Bernd WOLLSCHEID, Institute for Molecular System Biology, Zurich, Switzerland

Scientific delegate representing the HCERES:

Mr Pierre COUBLE

Representatives of the unit's supervising institutions and bodies:

Ms Christelle BRETON (representative of the Doctoral School "Ingénierie pour la Santé, la Cognition, l'Environnement" – ED n°216)

Ms Alix DE LA COSTE, CEA

Ms Anne GUERIN (representative of the Doctoral School "Chimie et Sciences du Vivant" – ED n°218)

Mr Yassine LAKHNECH, University Joseph Fourier

Ms Stéphanie POMMIER, INSERM

1 • Introduction

History and geographical location of the unit

BGE was created in 2011 as a research entity of the *Institut de Recherche en Technologies et Sciences pour le Vivant* (iRTSV; Institute of Research into Life-Sciences and associated Technology), on the site of CEA-Grenoble. The institute, which contains three others units, was initially dedicated to the theme "*Integrated functions of proteins - From life-science to nanotechnology*", organizes its next research activity under the theme "*Inspired by life architectures*". Historically, BGE resulted from the association of several groups working on proteomics, computational biology, nanobiotechnnology, signaling, *Drosophila* innate immunity, and pharmacological screening. BGE comprises, in June 2014, 90 staff members, including 56 permanent investigators. The unit is affiliated to three institutional bodies: CEA, Inserm and University Joseph Fourier, with CEA being the main provider of permanent positions. An important characteristic of the laboratory is the tight link existing between research activity and the activities of biotechnological platforms in proteomics, genomics, and pharmacology. BGE develops multidisciplinary approaches to develop state-of-the-art technologies in genomics, proteomics, imaging and medium throughput screening assays.

Management team

BGE was headed during the last contract by a 2-person team constituted of Mr Jérôme GARIN (DR CEA; director) and Mr Xavier GIDROL (DR CEA; deputy director). For the next five years, the unit will be led by a new tandem: Mr Xavier GIDROL (DR CEA; head of the Biomics team) acting as director and Ms Myriam FERRO (DR CEA; head of the EDyP team) as deputy director. This proposed directorial team has been accepted by the tenured scientists of the future teams and platforms composing the unit. Administrative and scientific topics are discussed during monthly meetings which put together the 4 BGE team leaders. Most of the decisions regarding BGE are discussed during this meeting. The council of unit is composed of six people that have been elected among scientists, administrative staff, PhD students and technicians, selected within the different groups. The council of the unit meets twice a year with the direction.

HCERES nomenclature

SVE1_LS2 Génétique, génomique, bioinformatique; SVE1_LS1 Biologie moléculaire et structurale, biochimie; SVE1_LS3 Biologie cellulaire, biologie du développement animal; SVE2_LS9 Biotechnologies, sciences environnementales, biologie synthétique, agronomie.

Unit workforce

Unit workforce	Number as at 30/06/2014	Number as at 01/01/2016
N1: Permanent professors and similar positions		
N2: Permanent researchers from Institutions and similar positions	28	27
N3: Other permanent staff (without research duties)	28	28
N4: Other professors (Emeritus Professor, on-contract Professor, etc.)		
N5: Other researchers (Emeritus Research Director, Postdoctoral students, visitors, etc.)	20	9
N6: Other contractual staff (without research duties)	14	2
TOTAL N1 to N6	**90**	**66**

Unit workforce	Number as at 30/06/2014	Number as at 01/01/2016
Doctoral students	12	
Theses defended	6	
Postdoctoral students having spent at least 12 months in the unit	8	
Number of Research Supervisor Qualifications (HDR) taken	1	
Qualified research supervisors (with an HDR) or similar positions	11	10

2 • Overall assessment of the unit

Global assessment of the unit

BGE has an excellent reputation in proteomics, with the team EDYP being a founding member of the national infrastructure in biotechnology and health ProFi (the head of the laboratory acting as head of this consortium), which represents at the moment the most important effort to organize proteomics in France (http://www.profiproteomics.fr/who-we-are/edyp-grenoble/), and of the European consortium Prime-XS (http://www.primexs.eu). During the last contract, the activity of the unit has also been characterized by a strong structuration of projects in functional genomics, organized by two teams (Biomics and Gen&Chem). Such an organization has widened the expertise of the unit. The overall quality of the scientific output during the last 5 years has been very good, and the laboratory has been able to obtain several important grants. BGE was organized into 5 teams which have collectively published nearly 300 publications, including papers published in Science, Science Translational Medicine, PNAS, Nature Protocols, etc. The team *"Laboratoire d'Etude de la Dynamique des Protéomes"* (EDyP) was headed by C. BRULEY, the group *"BIOMICrotechnologie & GénOMIQue Fonctionnelle"* (Biomics) was headed by X. GIDROL, the group *"Genetics & Chemogenomics"* was headed by Marie-Odile Fauvarque, the group "GIPSE" by Céline CHARAVAY and the group "ODYCELL" by Laurence AUBRY. Several people have left OdyCell, and people still associated with it at the end of the present contract will join the Biomics team, while GIPSE will become a platform. The location on a very strong scientific campus facilitates the access to outstanding technological platforms. This creates *ad hoc* conditions for developing ambitious scientific research. State-of-the-art approches in proteomics, *in vivo* imaging, and functional genomics are available within the host Institute. The close contact with LETI (Laboratoire d'Electronique et de Technologie de l'Information) also offers excellent opportunities for a prime access at innovative tools in nanobiotechnology. The experts have noticed the emergence of several small companies that develop the intellectual property of the unit. Overall, BGE appears to provide an excellent combination of basic science and translational research. The director during the last contract has developed a strong reputation in his field, and was assisted by solid scientists. The committee noticed a rational organization and an excellent commitment of the staff. The committee therefore considers that BGE is in good shape to grow even further its scientific excellence and increase its international visibility and attractiveness.

Strengths and opportunities in relation to the context

BGE has a well-established expertise in proteomics, bioinformatics, biostatistics, functional genomics, molecular and cellular biology. Its scientific environment on the CEA campus, and near the university campus and the hospital of Grenoble, provides different types of options for developing efficient scientific collaborations. The structuration of Grenoble in the context of an IDEX may also represent an interesting opportunity for opening up interactions of the unit with teaching structures and boost the recruitment of students at different levels. BGE has access to an exceptional set of local technological platforms and state of the art equipments, several of them (proteomics, in vivo imaging, screening, functional genomics) being located within the BGE buildings and managed by BGE scientists. The laboratory is to a large extent technologically oriented, hence the importance of the different platforms in the strategic of the unit. This is at the same time an opportunity and a threat as techological developments can be very expensive, especially for keeping the equipment at a state-of-the-art level. At the same time, this definetely opens the door to scientific breakthroughs. This situation explains why BGE is balanced between

basic science and translational approaches, the equilibrium between the two activities varying among teams. The optimal balance has to be defined in a team-by-team fashion.

Considering the complementary aspects that are explored by the different groups, a suggestion made by the experts is to develop further trans-group programs where expertise from the different groups could exert synergistic effects at the level of the unit as a whole.

Stronger connections with established pharmaceutical and biotech companies and with clinical research teams are also to be encouraged. A collaboration between the team Biomics and clinicians from the Grenoble hospital on prostate cancer was mentioned, but its effective start was too recent to have already produced a real impact. This type of initiatives probably represents a good hint of what should be really reinforced in the near future.

BGE has demonstrated its ability to attract financial support from governmental agencies (representing about 65 % of the grants in 2012-2013), charities and industries (representing about 16 % of the grants in 2012-2013). BGE has risen significant funds during the last contract (more than 1.2M€/year). The committee has noticed an important decrease of the staff (from 90 at the end of the contract to 66 at the start of the other), but it appeared that this was only an administrative matter (short term contracts being strictly limited by CEA to 18 months, the non-permanent staff present at the start of the next period cannot yet be mentioned and does not appear in the projection at the 1st of January 2016). In a way, this illustrates well the current situation of many French laboratories in life sciences, which largely depend on short term contracts.

Reinforcement of the international visibility of BGE scientists has to be one of the objectives of the next contract, with the aim to develop international attractiveness of the unit as a whole. During the last contract, several young scientists and one established investigator have joined the unit, already bringing an important expertise. This needs now to be consolidated, with the clear aim to increase further the impact of the publications on in-house thematics during the coming years. The presence of ambitious young scientists being in their most productive part of career should help in that context.

Weaknesses and threats related to the context

The committee did not identify major weaknesses.

The most obvious threats are essentially due to external factors that affect French science in general. These threats are clearly identified by the management. The total support received from CEA, INSERM and Grenoble University did not change much over the last 5 years. Money to the teams for running their research projects depends deeply on external grants in a context that is getting less favorable in France.

Funding the structure at an adequate level for meeting its objectives will therefore be a major challenge for BGE, especially at the end of several major grants (ProFi, etc…). Raising money at the European level will probably represent one of the next priorities for the different teams. This can be relevant considering that they represent at the moment less than 10 % of the grants.

The positioning as a technology-driven laboratory creates a permanent challenge for maintaining platforms at a competitive and up to date level. It requires a constant cycle of acquisition/upgrade/maintenance of equipments. While programs such as ProFi have perfectly secured the situation for some years, it is already necessary to anticipate the future, i.e. the end of this grant. This probably creates a situation that will have to be treated at the level of the governance and institutional bodies.

As a general rule, time spent by scientists in the management of platforms can be detrimental for the progress of their own research programs. Ideally, an appropriate staffing by dedicated personnel is the best choice for limiting the burden of platform management. This situation seems to exist at that level for the unit, with 28 permanent technicians/engineers (about one third of the total staff). The committee has noticed that the number of technicians and engineers reaching the age of retirement within the next 5 years is low: thus, it should not create a major issue during the next contract.

Despite the excellent environment and recognition of the BGE teams, the ability to recruit excellent post-doctoral fellows can be somewhat hampered by the combination of strict CEA rules (in line with the EPIC status), which limit in practice the duration of doctoral and post-doctoral positions to 3 or 4 years. Fortunately, this situation has evolved in a favorable manner.

The committee also noticed that the number of students in the largest team (EDYP) was low (4 PhD students, to be compared to 12 in Biomics, 5 in Gen&Chem and 3 in OdyCell). This can be due in part to the organization of the work, since an activity as a research platform is not always compatible with the organization of trainings for students.

While a more pro-active strategy to recruit the best possible students has clearly to be set up at the level of the unit, the committee also felt that the unit should strenghten its institutional relationships with the Grenoble University. A recruitment of a professor and/or assistant professor which research would be carried out in the unit could definitely be fostering the insertion of BGE within the local educational community.

BGE is affiliated to 2 doctoral schools: ED218 (chemistry and life sciences) and ED216 (engineering for health, cognition and environment). Two HDRs from BGE are affiliated to ED216. Ms Marie Odile FAUVARQUE is member of the committee of the ED 2218, and BGE regularly contributes to the different evaluations. The representatives of the two doctoral schools were satisfied by the interactions developed by the unit, and did not raised any concern. PhD recruitments of BGE are often outside Grenoble (including students from Moscow or Barcelona). This is probably due to the poor link currently existing with the local students (no professors/assistant professors are doing their research at BGE, see above).

The committee wants to emphasize that a good PhD thesis in biology always needs time, and encourages the unit in a policy of excellence for its students. Rather than pushing them to finish rapidly their work at the end of a third year, they can encourage a policy for having a first authorship in an international journal published before the end of their thesis. With 11 HDRs in the unit, the number of PhD students that are recruited every year by the teams appears well below the standards. There are between 1 (in 2007) and 5 (in 2012) PhDs starting each year. There was a raising trend during last years but it has definitely to be consolidated.

Recommendations

The experts committee appreciated the efforts made by the managing team during the last contract for developing new research activities, and attracting new investigators. This strategy should be pursued. The committee noticed an heterogeneity of size between the different teams. It might be wise to avoid too much differences. The location of one group (“Genetics & Chemogenomics”) in a different building clearly weakens its interactions with the two other teams. While the problem should have been cleared with the construction of a new building, the grants necessary for its construction have recently been compromised (drastic decrease of the CPER (Contrat de Projets Etat-Région) budgets)). This remains a pending issue that needs to be solved by the governance.

Collaborations between different BGE teams for solving major scientific issues should be encouraged.

The basis for funding should be enlarged, particularly by stimulating applications to ERC grants by young promising scientists and/or established investigators with high profile.

The number of PhD students and post-doctoral fellows, especially from foreign origin, should be increased, and any initiative favoring this should be taken, such as the use of English as the common language for scientific activities, or the development of a special help for facilitating their installation.