



Institut cellule souche et cerveau

Rapport Hcéres

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HCERES

High Council for the Evaluation of Research
and Higher Education

Research units

HCERES report on research unit:

Stem Cell and Brain Research Institute

SBRI

Under the supervision of the following
institutions and research bodies:

Université Claude Bernard Lyon 1 - UCB

Institut National de la Santé Et de la Recherche

Médicale - INSERM

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

Wolf SINGER, 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: | Stem Cell and Brain Research Institute |
| Unit acronym: | SBRI |
| Label requested: | UMR_S |
| Present no.: | UMR_S 846 |
| Name of Director (2014-2015): | Ms Colette DEHAY |
| Name of Project Leader (2016-2020): | Ms Colette DEHAY |

Expert committee members

| | |
|----------|---|
| Chair: | Mr Wolf SINGER, Max Planck Institute for Brain Research, Frankfurt, Germany |
| Experts: | Ms Corinne COTINOT, INRA Jouy-en-Josas (representative of the INRA) |
| | Ms Isabelle DUSANTER-FOURT, Institut Cochin |
| | Ms Patricia GASPARD, Université Pierre et Marie Curie |
| | Mr Martin GIESE, Werner Reichardt Centre for Integrative Neuroscience, University of Tuebingen, Germany |
| | Ms Marie-Pierre JUNIER, Université Paris 5 Descartes (representative of the Inserm) |
| | Mr Tony J. PRESCOTT, University of Sheffield, UK |
| | Mr Till ROENNEBERG, University of Munich Ludwig Maximilians, Germany |
| | Mr Franck VIDAL, Aix-Marseille Université (representative of the CNU) |

Scientific delegate representing the HCERES:

Mr Jacques NOËL

Representatives of the unit's supervising institutions and bodies:

Ms Bénédicte DURAND (representative of the Doctoral School n°340 BMIC)

Mr Remi GERVAIS (representative of the Doctoral School n°476 NsCo)

Mr Germain GILLET, University of Lyon 1 Claude Bernard

Ms Françoise MÉDALE, INRA

Ms Anne ROCHAT, Inserm

1 • Introduction

History and geographical location of the unit

The Stem Cell and Brain Research Institute (SBRI) is located in Lyon and was created in 2007 by Mr Henry KENNEDY and in 2011, renewed under the directorship of Ms Colette DEHAY, with Mr Henry KENNEDY as deputy director. SBRI is affiliated to Inserm and University de Lyon 1 Claude Bernard with strong links to INRA and CNRS. SBRI research is multidisciplinary with interests ranging from stem cells biology, developmental neurobiology, integrative and cognitive neuroscience, chronobiology disorders and robotics.

Management team

Since 2011 the SBRI is under the directorship of Ms Colette DEHAY, with Mr Henry KENNEDY as deputy director.

HCERES nomenclature

SVE, LS5 Neurobiologie, LS3 Biologie cellulaire, biologie du développement animal.

Unit workforce

| Unit workforce | Number as at 30/06/2014 | Number as at 01/01/2016 |
|--|-------------------------|-------------------------|
| N1: Permanent professors and similar positions | 9 (2,6 FET) | 10 (2,9 FET) |
| N2: Permanent researchers from Institutions and similar positions | 21 | 20 |
| N3: Other permanent staff (without research duties) | 15 (14,3 FET) | 17 (16,3 FET) |
| N4: Other professors (Emeritus Professor, on-contract Professor, etc.) | | |
| N5: Other researchers (Emeritus Research Director, Postdoctoral students, visitors, etc.) | 12 | 12 |
| N6: Other contractual staff (without research duties) | 18 (17,5 FET) | 15 (14 FET) |
| TOTAL N1 to N6 | 75 (67,4 FET) | 74 (65,2 FET) |

| Unit workforce | Number as at 30/06/2014 | Number as at 01/01/2016 |
|---|-------------------------|-------------------------|
| Doctoral students | 19 | |
| Theses defended | 27 | |
| Postdoctoral students having spent at least 12 months in the unit | 17 | |
| Number of Research Supervisor Qualifications (HDR) taken | 4 | |
| Qualified research supervisors (with an HDR) or similar positions | 20 | 20 |

2 • Overall assessment of the unit

Global assessment of the unit

The SBRI unit is a unique research institution in that it unites under the same roof seven, and in the future 9 self-sustaining groups that are active in different fields of research ranging from stem cell research all the way up to cognitive psychology and robotics. The common denominator is the shared interest in the development, structure and function of the brain. This assures strong cohesion among the groups, reflected by an impressive number of shared publications and joint utilization of a broad spectrum of methodological and disciplinary competences. This added value of interdisciplinarity is further enhanced by the availability of a rich and well managed technical infrastructure that provides state of the art equipment and competent service to all groups of the institute. In addition to its interdisciplinary nature the institute is distinguished by several other remarkable features:

- 1) the focus on comparative research in rodents and non human primates, the latter having become a deplorable rarity in Europe;
- 2) the efforts of all research groups to invest in translational research with respect to both clinical and industrial applications;
- 3) the strong and very productive engagement in both national and international research networks, which assures access to complementary know how and infrastructure not available in the institute;
- 4) the remarkable success in attracting third party funding with the surprising effect that 87% of the recurring budget is secured by non-institutional funding.

Strengths and opportunities in relation to the context

Quality of science: the major strength of the height teams assembled in the SBRI is the outstanding quality of their scientific leaders, some of which are among the world leaders in their fields. For this very reason the research topics pursued by the various groups are at the forefront of the world wide attempts to understand the brain in health and disease and the quality of the pursued research is at the highest international level. Due to the strong and well managed infrastructure, the applied methods are cutting edge and comply with world standards. Accordingly the quality of the publications of the various groups is excellent as documented by the large number of papers that got accepted in high ranking journals and the impressive amount of peer reviewed funding from external sources. This very successful recruitment of extramural funding by both local and international agencies also testifies that not only the track records of the applicants but also their visions for future projects are judged as highly competitive. These markers of quality are complemented by the high international visibility of the institute and its scientists. These are invited to participate in prestigious conferences, to give talks at universities with high standing and to publish reviews on their work in high impact journals with peer review. While all research lines pursued in the institute are addressing the most challenging questions in contemporary brain research, the combination under the same roof of stem cell research with investigations in non-human primates is extremely rare if not unique. It has the great potential to lay the grounds for stem cell therapy in human subjects and the development of transgenic monkeys. Both are among the most challenging but also promising endeavors of contemporary brain research. Remarkable is also the complementation of biological research with cutting edge computational modeling and robotics. These fields have not only become essential for progress in the neurosciences but have considerable translational potential for the design of intelligent artifacts. The review committee unanimously subscribes to this appreciation of the science performed by the scientists of SBRI.

Institutional dynamics: there is a high turnover of scientists at the level of students and postdocs. Many PhD students move after their exam to excellent institutes in other countries and are replaced by recruitment of highly qualified postdocs, mainly from Europe. Often these have been formed in the institute and now attempt to return after their postdoc and apply for positions at Inserm, CNRS and INRA. Others join as postdocs on time limited contracts. The continuity is assured in addition to the PIs by 22 researchers with permanent contracts, three of which possess HDRs, the qualification to supervise PhD students. The high dynamics of the institute is also reflected in the recent recruitment of two further teams which are complementing the already strong focus in stem cell research. Thus, the institute is engaged in a very valuable and constant renewal process. The concomitant expansion of methodological expertise and research activities is coped with by recent important investments in common service structures and additional labs. Due to national regulations there is, however, a continuous drain of expertise caused by highly trained PhD students who have to leave the institute 6 months after their exam. Usually publications based

on the thesis work are not accomplished at that time and the students have little chance to participate in training of their successors.

Governance: a particularly noteworthy and highly appreciated feature of this institute is its lean and cooperative management structure (a double headed directorate, a pilot committee consisting of the directorate and the time leaders and the "conseil de laboratoire"). This rather horizontal structure allows for short paths, fast responses and a high degree of flexibility. Although the various units are independent with regard to their budget and scientific goals and the institute comprises numerous and heterogeneous personnel (students, postdocs, tenured senior scientists, technicians, animal keepers and engineers), all parties are well represented in the respective governance bodies and are invited to participate in the deliberations on matters of concern on a regular schedule. An appreciated aspect of this cooperative structure is the shared use of high-end technical infrastructure. This allows pooling of resources, recruitment of highly competent service personnel and implementation of expensive high performing instrumentation. Well adapted to the "democratic" governance structure of the SBRI is the fact that it is headed by a director and a co director, two personalities that ideally complement one another with respect to seniority and scientific competences. Their joint expertise covers a large part of the institute's research agenda.

Teaching: there is no formal obligation for the institute's scientific staff to engage in teaching. The initiative to engage in teaching is left essentially to the individual scientists. Some of them take this opportunity, offer lectures and courses and use these contacts to recruit master and PhD students for their teams. The institute is also engaged in two graduate schools in cooperation with the University of Lyon, from which a small number of PhD students is recruited. The number of successfully supervised master and PhD theses is appropriate given the number of scientists possessing HDRs.

Outreach: the staff of the institute is to be felicitated for the remarkably intense efforts to communicate the goals and results of their research to the public at large in public talks and the media, to engage in discussions on animal rights as well as on the general ethical aspects and societal consequences of their research.

Translation: the tight connections of certain groups to clinical departments in Lyon and Grenoble and the cooperation with industrial partners have the highly appreciated consequence that each of the groups devotes some of its resources to translational research. These initiatives are remarkably successful as testified by patents and formal cooperation treaties.

Economic efficiency: the relation between budget and productivity is excellent and matches that of other renowned research institutions, even though the institutional funding is considerably lower than in comparable institutes abroad. This is remarkable as it indicates that the scientists at the institute maintain high output despite the fact that they must invest much of their time to writing grants and applying for extramural funding. Just as the time limits for PhD students lead to a continuous drain of expertise, the legal limits for renewal of contracts of the technical staff make it very difficult to cultivate and preserve the know how needed for the management of the technically very challenging infrastructure. The institute is to be felicitated to keep up with world standards despite these severe constraints.

Cooperation: to maintain the high degree of interdisciplinarity and to assure access to methods not available in the institute, the teams have entered into cooperation with other institutions both in Lyon and abroad for deep sequencing, bioinformatics, flow cytometry, MRI imaging in humans and non human primates, computational modeling, development of transgenic monkeys. These initiatives have led to the foundation of remarkably diverse and high quality multi-user platforms in the Lyon region. Moreover, all groups participate in various constellations in both local clusters of excellence (e.g. LabEx CORTEX) and international research consortia. These cooperations permit pursuit of challenging projects that would not be realizable by only relying on the institute's infrastructure and greatly enrich through regular meetings and seminars the curricula of students and staff and consolidate the embedding of the institute in the scientific community of Lyon.

Weaknesses and threats related to the context

Identified weaknesses and potential threats are mainly due to external factors that can be influenced only little by directorate and the staff. One problem is the low level of intramural funding which makes it difficult to plan long-term investments for future developments. At present, a large part of the shared services is financed by the overheads of extramural funds acquired by the PIs. This may preclude acquisition of expensive equipment that cannot be justified by individual grants. Intramural funding is used mainly for the maintenance of the status quo, the modest extension of lab space and the salaries of permanent non scientific staff. The admirably lean infrastructure at the administrative level is problematic as the extensive funding through third parties and the need for local networking with shared infrastructures causes heavy administrative load that cannot be coped with on the long run by the present

secretarial staff. Already now, a substantial part of administrative duties are taken on by the scientists. Following the recruitment of two new teams, the institute is now also at the limit of possible expansion and further implementation of new lines of research or extension of projects will require investment in the building. Another problem is the limited duration of contracts with technicians and engineers working in the service departments (Sauvadet Law). Such positions are difficult to finance through grants and if intramural funds permit only temporary employment, it is virtually impossible to obtain and maintain a high level of competence and continuity in these domains. As high tech support becomes increasingly important for cutting edge science this jeopardizes the quality of the institute's research. A further weakness imposed by the system is the limitation of contract duration for postdocs. It leads to the drain of competences mentioned above and often makes it impossible for the best of the young researchers to obtain grants (ERC, Marie Curie, etc.) for the consolidation of their own research career. These grants are given for periods of usually five years and are meant to pave the way into an independent research career. In other European countries these grants are often the basis for later promotion to tenure positions. Postdocs at the institute cannot stay for the duration of such grants. Their only option for staying at the institute is recruitment by Inserm, CNRS, INRA or UCBL, which greatly restricts early independence and mobility and deprives the institute of the most competitive young researchers. Finally there is the danger that the institute will lose its outstanding profile in the domains of informatics, simulation and robotics. These disciplines become increasingly important for biology and particularly for brain research. The reason is that biological systems, and above all the complex brains of mammals, exhibit exceedingly complex, non linear dynamics which require for analysis sophisticated mathematical algorithms and massive computing. At the moment the institute lacks high level engineers in this field, again a consequence of the imposed employment policy and this lack cannot be compensated by outsourcing.

A minor but noteworthy threat is a certain difficulty in the recruitment of students (master and PhD) which is reflected in the number of supervised theses. Here intensification of teaching activities, organisation of schools and an increase of positions made available by the two graduate schools might be helpful. In this context it is worth mentioning that non French speaking scientists have difficulties to profit from courses required to obtain licenses, e.g. for animal experimentation, because most of these courses are offered only in French.

Recommendations

The major threats for the institute's future (legal constraints for the employment of scientists and technicians, low recurrent funding, space limitations) cannot be countered by the institute. To somewhat mitigate the recruitment problem of students, engagement in teaching and qualification for HDRs should be encouraged. Efforts need to be made to recruit more secretarial help, to maintain the high level of expertise in the domain of high tech infrastructure and to recruit additional engineering competence for informatics and supercomputing. It might also be considered to change the affiliation of the institute with the university and to switch from the life sciences to the sciences as this might alleviate some of the recruitment problems.