agence d'évaluation de la recherche
et de l'enseignement supérieur

Section des Unités de recherche

AERES report on the research unit

Laboratoire de Neurobiologie de la Cognition

From the

CNRS

Université d'Aix-Marseille 1

January 2011

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Le Président de l'AERES

Didier Houssin

Section des unités de recherche

Le Directeur

Pierre Glorieux

January 2011

Research Unit

Name of the research unit : Laboratoire de neurobiologie de la cognition

Requested label : UMR CNRS

N° in the case of renewal : 6155

Name of the director : M. Bruno POUCET

Members of the review committee

Committee chairman

M. Pierre-Paul VIDAL, Université Paris 5

Other committee members

M. Stéphane CHARPIER, Université Paris 6, Paris

M. Yoon CHO, Université de Bordeaux 1, Bordeaux

M. Marcel BRASS, Ghent University, Belgium

M. Martin MEYER, University of Zurich, Swizzerland

M. George DISCALA, Université de Bordeaux 1 (CoNRS member)

M. Marie TRABALON, Université de Nancy 1 (CNU member)

Observers

AERES scientific advisor

M. Christian GIAUME

University, School and Research Organization representatives

Mrs. Nathalie LERECHE, CNRS

Report

1. Introduction

- Date and execution of the visit: 24/01/2011 from 9h AM to 5h30 PM

The preparation and execution of the visit was as specified in the Aeres guidelines. The visit went smoothly with all aspects of the evaluation covered satisfactorily.

The program of the visit was the following

Presentation of past activity and project of the unit

Presentation of team 1 "Cognition and pathophysiology of basal ganglia"

Presentation of team 2 "Attention, chronometry and cerebral dynamics"

Presentation of team 3 "Neural bases of spatial cognition"

Presentation of team 4 "Neural bases of sensorimotor behavior"

Meeting with University and CNRS representatives, committee members and AERES representative

Presentation of team 5 "Spatio-temporal dynamics of auditory and motor learning"

In parallel:

Meeting with permanent scientists

Meeting with PhD students and non permanent personnel

Meeting with engineers, technicians and administrative assistants

Discussion between the committee and the director of the unit

Final door-closed meeting (committee members and AERES representative)

- History and geographical localization of the research unit, and brief presentation of its field and scientific activities

The Laboratory of Neurobiology and Cognition (LNC) is a research unit jointly administered by the CNRS and the University of Provence. The LNC is part of the Pôle 3C "Behavior, Brain, Cognition", itself embedded within a larger consortium, the Federative Research Institute (IFR) in Brain and Cognitive Science. The overall research aim of the LNC is to understand the neural bases of information processing underlying cognitive behavior in both humans and animals. This aim relies on a methodological approach that allows neural activity to be either manipulated (lesions, inactivations, pharmacology, transcranial magnetic stimulation – TMS) or measured (functional magnetic resonance imaging – fMRI, electroencephalography – EEG, magneto-encephalography – MEG, single unit recordings, local field potentials – LFP). The new unit will be divided into five teams.

The LNC is located in The Center for Behavior, Brain, and Cognition at the University of Provence (Pôle 3C: Comportement, Cerveau, Cognition), which is composed of three research groups working in the area of cognitive and integrative neuroscience (Cognitive Psychology - UMR 6146; Integrative and Adaptive Neuroscience - UMR 6149; and Neurobiology of Cognition - UMR 6155). The Pôle 3C provides a scientific environment that roughly spans the research areas covered by section 27 (Comportement-Cognition-Cerveau) of the Comité National de la Recherche Scientifique (CoNRS). Research performed at this center primarily concerns fundamental research in cognitive psychology, and cognitive and integrative neuroscience, but also importantly clinical research, and involves a wide variety of techniques including those of molecular biology and techniques

used to study human and animal behavior in a social setting. Today the Pôle 3C comprises about 180 members (50 lecturers/professors, 55 research scientists, and 75 Ph.D students/post-docs). The research groups of the Pôle 3C, including the LNC, are also engaged in active collaborations with the neuroscience group at the Timone hospital, as part of the interdepartmental research institute IFR131 "Sciences du Cerveau et de la Cognition" (directed by the director of the unit, LNC). Much of this collaboration is related to the use of brain Imaging equipment for human research at the Timone (fMRI, MEG) and animal research at St. Charles (fMRI). During the last 4 years (2006-2010) the Pôle 3C has obtained 3 ERC grants, 27 ANR grants, has deposited 6 copyrights, created 1 company (Mind Autonomy Research), 1 spin-off of the university of Provence (Siamed) and published 539 articles in refereed journals, 164 of which appeared in top-ranked journals (AERES ranking "excellent") and 123 in journals ranked "very good", and has organized a total of 46 conferences and workshops (mainly international).

- Management team

The head of the unit is M. Bruno POUCET.

- Staff members

	Past	Future
N1: Number of researchers with teaching duties (Form 2.1 of the application file)	5	10
N2: Number of full time researchers from research organizations (Form 2.3 of the application file)	14	12
N3: Number of other researchers including postdoctoral fellows (Forms 2.2, 2.4 and 2.7 of the application file)	7	13
N4: Number of engineers, technicians and administrative staff with a tenured position (Form 2.5 of the application file)	7	6
N5: Number engineers, technicians and administrative staff without a tenured position (Form 2.6 of the application file)	3	
N6: Number of Ph.D. students (Form 2.8 of the application file)	11	
N7: Number of staff members with a HDR or a similar grade	9	12

As indicated in the table of staff members for each team, technicians and administrative are not distributed to a specific team but attributed as needed for ongoing programs

2 . Overall appreciation on the research unit

- Summary

This unit seeks for its renewal after four productive years. It is a european-class unit with excellent scientists at several levels of seniority. Senior researchers with a good reputation are complemented by many junior colleagues, which have already shown that they can operate and contribute at a top international level. The new recruitments are excellent with regard to quality, and potential. All teams are attractive and develop interesting projects. A good sign indicator of their activity is the publication output with a very significant number of papers published in high impact factor journals. Several members of the units are also active in teaching activities at all levels. Overall, the committee was impressed by the quality of science in all groups. There is no question the UMR 6155 deserves a strong support of the funding agencies.

- Strengths and opportunities

This unit brings together a group of 24 investigators with interests in cognition from the cellular to the behavioral level, which allows a real multidisciplinary approach. A feature of this laboratory is also that half of investigators who carry heavy teaching duties. It gives them in theory less time and opportunity for research and making it more difficult for them to participate as in the research community. In that context, the enthusiasm and commitment of these colleagues to science and education is remarkable. During the past years the group has improved the quality of the journals in which they are publishing, so that many more of the group's publications are now in first-rate refereed journals. The students, postdocs and technicians of the LNC agree on the fact that the unit is a supportive and collegial environment. In good agreement with the opinion of the insiders, and it is also the impression of the committee, that facilities and know-how are shared.

- Weaknesses and threats and recommendations

In the context of the reunification of the three Universities of Marseille, the visibility and the potential of the Centre Saint-Charles (Pôle 3C)is certainly weakened by its subdivision in three units of relatively small size. Put together these three units would have a perimeter more adequate to confront the imminent restructuration of the University in Marseille.

The strengths and weaknesses of the LNC are linked: while the number of topics to be studied broadens the scientific culture of the laboratory, it also can lead to a lack of a specific research focus. The inclusion of a significant number of teaching faculty is commendable for many reasons, but also necessarily results in minoring the contribution to the international research community due to the teaching load. In that context, it is very important that the non-teaching scientists be highly productive, and support consistently and significantly their teaching colleagues.

The unit has too low number of permanent administrative and technical members as compared to the number of permanent scientists (ratio 0.24) and retirements during the coming years are going to worsen the situation. In that regard, the Committee noticed a 1 to 5 ratio in the favor of the CNRS concerning the origin of the supporting staff. It is an indication that the University should be sollicited in priority to obtain new positions.

There is a problem of space being the increase of size of the LNC which evolved from 20 people in 650 m2 to 60 in 750 m2 over the past years.

Finally, the MRI needs to be replaced but that is a problem, which interests all Units in the Aix-Marseille University. Another point in that regard, concerns the poor fuctioning of the MEG and its maintenance.

- Production results

A1: Number of permanent researchers with teaching duties (recorded in N1) who are active in research	5
A2: Number of permanent researchers without teaching duties (recorded in N2) who are active in research	10
A3: Ratio of members who are active in research among staff members [(A1 + A2)/(N1 + N2)]	100%
A4: Number of HDR granted during the past 4 years (Form 2.10 of the application file)	0
A5: Number of PhD granted during the past 4 years (Form 2.9 of the application file)	10

3 . Specific comments

- Appreciation on the results

Being the production detailed below, there is no doubt for the committee that the research are original and of good quality. This facilitates a number and stable partnerships within the building, in Marseille through the IFR and at national and international level. Key numbers include the following:

- 95 publications (2006-2010) of which 2/3 in journals rated very good or excellent by AERES
- Number of chapters: 15
- Number of proceedings in international meeting: 60
- PhD theses: 12 defended; 11 in progress
- Invited conferences: 89
- Editorial boards: Eur. J. Neurosci, Hippocampus, J. Psychophysiol., Frontiers in Neuroscience, Behav. Brain Res., etc.
- Organization of national meetings: 7 ;
- Organization of international meetings: 14
- Involvement in administration and committees ANR, ATIP, CoNRS, University Committees, CS-INSB, DGA, EBBS, EBPS, Fond. De France, Soc. Neurosciences, etc.
- 38 research contracts (ANR, CNES, DGA,ERC, ESF, FRC, MILDT, etc.)
- About 2/3 of yearly budget (not including salaries) comes from sources outside CNRS

- Appreciation on the impact, the attractiveness of the research unit and of the quality of its links with international, national and local partners

The number and the reputation of the awards obtained by staff members, including invitations to international conferences and symposia is significative and includes for instance a CNRS Bronze Medal, an ERC strating frant and the election of the team leader as the EBPS President.

The number of PhD students is quite reasonable ie 11 over the past four years, specially in view of the fact that it was done by 7 supervisors. The group had also two visitors from Quebec and 7 post doctoral students. It confirms the ability to recruit high levels scientists, post-docs and students, and more particularly from abroad. The comittee recommend the other senior members of the group to supervise also PhD students.

This group is quite remarkable in the sense it multiply its basic funding by three by applying to a number of grants. For instance, the LNC applies to the ANR grants with a high rate of success: altogether, 7 ANRS grant over four years. It also got an ERC starting grant.

The participation to international or national scientific networks, existence of stable collaborations with foreign partners

The Unit has several international collaborations with foreign partners. However a recommendation would be to seek more European grants and to insert the members of the LNC in European network such as COST.

The LNC is heavily involved in teaching, public education (interviews in (Women's Health, Paddler Magazine, Pour la Science, Cahiers techniques dela Fédération Française de Canoë-Kayak, Ça m'intéresse) and above all its member publish excellent papers both in basic and clinical research.

- Appreciation on the management and life of the research unit

The scientific and administrative organization of the unit and the rules for decision-making are well thought. The rules of laboratory governance are defined by the Conseil de laboratoire (Unit council), composed of 12 members, either appointed or elected, who discuss and decide upon the major issues. Several delegates will be specialized on specific issues such as public relations, health and security.

The committee met the researchers of the unit. They work in rather good conditions and can find in the unit a very good scientific environment and appropriate technical facilities. They are no concerns about their level of autonomy (author position in papers, possibility to write grant applications, recruitment) whatever the team they belong to. The problem of space highlighted by the director of the LNC, would required more concertation at the level of the Pôle 3C and again rises the question of the creation of an Institute.

The committee met technicians. They acknowledged that they are working under good conditions and in a good quality scientific environment. They appeared to like their involvement and the way science was driven in the last four years and do not appear to be worried about the future larger group and their career development. They clearly are a great asset for the Unit. The committee strongly recommends a prospective management of the three technicians in CDD to prepare their future at the end of their contract and that the the number of CDD remains manageable in that respect.

The committee met with the PhD students and postdocs and was impressed with their enthusiasm, maturity, and competence. Clearly, the unit is a great place to make research for these young colleagues. The PhD students and postdocs profit from an in-house seminar series where seminars are given by permanent researchers. In the discussion, several points were identified that not only demand the attention of the unit leadership but would also require a coordination at the pole 3 C level.

Positive points includes

- Good working atmosphere and good relationships between researchers and students.
- Inter-team collaborations between the pole 3C members.
- Monthly seminars are organized at the pole 3C where international and national speakers are invited.
- In most teams, weekly meetings are organized.
- Once per month, PhD students organize informal talks to encourage PhD students and post-docs to present their work in English.
- PhD students are satisfied by the supervision of their PhD.
- All PhD students and post-docs have already participated to French congresses.
- M2 students are well supervised and encouraged in their research for PhD funding.

Improvement should be envisaged

- Difficulties to access the campus outside of the working hours, which is incompatible with some experiments
- Students may be more encouraged to follow trainings which could be useful for our daily work (computing, statistics, …)
- Few PhD students have participated to European or international congresses, but most of them are in first year of their PhD; on the contrary, all postdocs have participated in European or international congresses.
- Organization and representatives: The representative was not there. There is no dedicated office for PhD students and postdocs in the Pole 3C (with an english-speaking person for foreigners) that can help with administrative tasks (e.g. contracts), assist foreign PhD students and postdocs (e.g. with visa, police formalities, health insurance, bank accounts). The group of PhD students and postdocs needs to be strongly encouraged to create a students and postdocs association in the Pole 3C.0000
- Researchers PhD students and postdocs need a common/social room to rest, meet, and/or eat, which would catalyze interactions between scientists from different groups/sections/fields/floors of the pole 3C.

The contribution of the research unit staff members to teaching and to the structuration of the research at the local level.

As mentioned above, five investigators of the LNC carry heavy teaching duties, thus giving them less time and opportunity for research. Being the number and the level of their publications, their dedication to science is impressing. The LNC is strongly involved in several university degrees at both local (License and Master in Neurosciences of Aix-Marseille University) and national levels (Research Master of the Universities 14 of Grenoble, Poitiers, Toulouse). In total, 20 DEA / Master 2 and 10 PhD theses have been defended during the 2006-2010 period, which is a good indicator of the LNC's involvement in the transmission of knowledge through research. Continuous training of researchers, students, technicians and engineers is also an important aspect of the LNC's vitality.

- Appreciation on the scientific strategy and the project

The committee believes that there is no doubt about the relevance and feasability of the long term (5 years) scientific project of the LNC. The projects are original and exciting and the allocation of ressource does not pose problem. As mentioned above, the scientific and administrative organization of the unit and the rules for decision-making are well thought. There is a good transparency in the decisions of the management of the unit in the functioning of the technical facilities.

The committee has two major problems concerning the number of supporting staff and the space. Concerning space, a better concertation at the level of the Pôle 3 C is recommended. Concerning the supporting staff, being the

already large involvement of the CNRS and the large increase of the number of teaching members in the future LNC, the committee hope that the Aix Marseille University will provide the additional positions, which are absolutely required by the development of the LNC.

The committee recommends that, being the good shape of the unit, its management increases the integration of the UMR 6155 with the other units of Pole 3C. A termination of the classical 'units' and the establishment of a local Institute are regarded by the committee as an excellent move in the years to come and possibly at mid term of the coming “plan quinquennal”. It could strengthen research in many ways as it will, amongst other advantages (1) promote stronger scientific interactions and emergence of cutting edge projects (2) facilitate the functioning of the present institute-wide platforms and promote the creation of new ones, (3) strengthen the atractivity of the local units in their quest to obtain funding or to implement new infrastructures, (4) built a stronger ' identity', and (5) allow to rationalize the implantation management and circulations of the various teams of the building. A continuous stream of transfers of researchers, supporting staff, students, spaces in-between the units of the pole 3C would ultimately lead also to the creation of a Research center, but with a definite risk it occurs in complex conditions. The committee believes that a merge between Units of the same size and scientific level in a near future is a better solution. Being the great potential and strength of the

Pôle 3C, it is an ideal basis for an ambitious research center, which will have the adequate visibility at the national and international level (almost 190 members, 50 lecturers/professors, 55 research scientists, and 75 PhD students/post-docs).

4 . Appreciation team by team

Team 1: Cognition and patho-physiology of the basal ganglia

Team leader: Marianne AMALRIC

- Staff members

	Past	Future
N1: Number of researchers with teaching duties (Form 2.1 of the application file)	1	1
N2: Number of full time researchers from research organizations (Form 2.3 of the application file)	4	3
N3: Number of other researchers including postdoctoral fellows (Forms 2.2, 2.4 and 2.7 of the application file)	3	1
N4: Number of engineers, technicians and administrative staff with a tenured position (Form 2.5 of the application file)	0	0
N5: Number engineers, technicians and administrative staff without a tenured position (Form 2.6 of the application file)	0	
N6: Number of Ph.D. students (Form 2.8 of the application file)	1	
N7: Number of staff members with a HDR or a similar grade	3	2

- Appreciation on the results

This team, headed by a confirmed and internationally recognized scientist, focused its recent researches on the reward-based learning functions of the basal ganglia and on the therapeutic treatments of motor deficits and addiction disorders due to functional dysregulation of these subcortical circuits. An original aspect of their researches is to combine electrophysiology, pharmacology and behavioral tests to correlate, in behaving animals (rats and monkeys), changes in neuronal activities with normal and pathological processes and to evaluate the efficiency of therapeutic interventions. In the last 4 years, they obtained three main findings that significantly improved the knowledge in the related fields of research: 1] neuronal activity in the striatum and the subthalamic nucleus is related to reward-based learning processes and to the detection of pertinent motivational stimuli, 2] high frequency stimulation of the subthalamic nucleus is a potent therapeutic strategy to treat cocaine addiction and, 3] the activation or inhibition of glutamate metabotropic receptors can alleviate the motor symptoms of Parkinson disease.

These researches led since 2006 to 25 original publications in peer-reviewed, high-quality, international journals, including PNAS, Lancet Neurol. and Journal of Neuroscience, 39 invited conferences, 29 communications in international meetings and 2 PhD theses. It is important to note that a significant part of this scientific production was carried out by a researcher who will leave the team at the end of 2011. The team made constructive collaborations with local, national and foreign (Switzerland, USA, Italy, UK) partners concretized by original publications.

- Appreciation on the impact, the attractiveness of the team and of the quality of its links with international, national and local partners

All of the members of the team have networks of collaboration with local, national and international partners. The main attractiveness of the future team is its pertinent composition, four high-level researchers with specific and complementary experimental competences. Their skill in in vivo electrophysiology combined with behavioral training is a major advantage for the international competition in their field of researches.

As attested by their numerous communications in international meetings and foreign institutions, the international influence of the team is indubitable.

This team obtained since 2009, three substantial national grants that warrant their scientific activity until 2014.

However, the composition of the team will be weakened in the next year, from 5 to 4 researchers/teaching-researchers together with a decrease in the number of technicians (from 3 to 1) and only 1 PhD and 1 post-doctoral student.

- Appreciation on the scientific strategy and the project

The scientific projects of the Team #1 are a continuation of their previous studies on parkinsonian physiopathology with however the development of novel experimental strategies, such as optogenetic tools, and an extension of their investigations at molecular and cellular levels, consistent with the recruitments of new researchers specialized in the related scientific fields. Three main topics will be investigated: 1] the cellular and functional impact of Glu-metabotropic receptors on the dysfunction of GABA and Glu transmission in animal models of Parkinson disease, 2] the influence of striatal cholinergic transmission in parkinsonian mice by selectively manipulating the Ach interneurons by optogenetic techniques and, 3] the involvement of K channels in the regulation of basal ganglia neurons activity in normal and pathological (DA deprived) conditions.

Although most of these sub-projects have a reasonably good guaranty to succeed, they are not sufficiently interconnected and the overall project would benefit from more coherence. Moreover, the pertinence of the "K" project is questionable since the lack of specificity in the pharmacological approach (systemic injection of apamin).

- Conclusion

  - Summary

This team, headed by a confirmed scientist, has a solid expertise in the field of researches that will be developed in the future and the pertinence and feasibility of most of their projects are undoubted, though their coherence should be improved with internal collaborations enhanced.

  - Strengths and opportunities

The team regroups high-level researchers, with specific and complementary skills, qualified to explore new pathophysiological processes and treatments of Parkinson disease, from motor and cognitive symptoms to cellular and molecular mechanisms.

  - Weaknesses and threats

The different sub-projects are not sufficiently interconnected and the "Cognitive" aspect of the global project, as expected from the title of the Team, is unsatisfactory. Given the wide-ranging of the global project, the future number of PhD and post-doctoral students is relatively weak.

  - Recommendations

The development of a tight internal collaboration with the Team 3 ("Neural bases of spatial cognition"), which will investigate the role of the striatum in spatial cognition, must be encouraged in order to develop the researches on the cognitive functions of basal ganglia. Finally, more technical and human support is absolutely necessary for a successful achievement of this very ambitious 4-years project.

Team 2: Attention, chronometry and cerebral dynamics

Team leader: Thierry HASBROUCQ

- Staff members

	Past	Future
N1: Number of researchers with teaching duties (Form 2.1 of the application file)	2	2
N2: Number of full time researchers from research organizations (Form 2.3 of the application file)	3	4
N3: Number of other researchers including postdoctoral fellows (Forms 2.2, 2.4 and 2.7 of the application file)	3	6
N4: Number of engineers, technicians and administrative staff with a tenured position (Form 2.5 of the application file)	0	0
N5: Number engineers, technicians and administrative staff without a tenured position (Form 2.6 of the application file)	0	
N6: Number of Ph.D. students (Form 2.8 of the application file)	5	
N7: Number of staff members with a HDR or a similar grade	2	3

- Appreciation on the results

Team 2 has carried out multi-methodological research in a very timely research field, namely the functional and neural bases of cognitive control. Their research contribution is original because it integrates a strong experimental approach with a technically elaborated neuroscience approach. This strength is reflected in a number of publications in leading journals of the field such as the Journal of Cognitive Neuroscience. Two PhD students finished their PhD in Team 2 and four PhDs are in progress. The team gives a very integrated and stabile impression. The total number of publications is 32, which is fine. The number of publications with one member of the ream as first or last author is 29, which comfort the good appreciation of the publication list of the team.

- Appreciation on the impact, the attractiveness of the team and of the quality of its links with international, national and local partners

Team 2 is very well integrated in the Institute. It has collaborations with team 4, team 5 and team 1. Given their excellent methodological knowledge, team 2 supports other teams in the application of EEG and fMRI. The team was recently able to attract international postdoctoral researchers indicating their international reputation. Importantly, the ERC starting grant obtained by a member of the team illustrates the good international standing of the team.

Team 2 has a number of international collaborations with leading groups in the field all around Europe and the US and collaborates in national and international funding schemes.

Overall, the funding the team attracted is excellent, in particular given the ERC starting grant.

Members of the team have received a national award from the CNRS, a honorary professorship and a visiting professorship.

- Appreciation on the scientific strategy and the project

The project builds on the strength of the team, namely the methodological and experimental know how. Furthermore, it widens the scope of the team by adding a developmental and a social perspective. Finally, it starts to apply the acquired knowledge to the domain of psychopathology. Given the current composition of the team and the strong links to other teams in the institute the goals of the project are realistic. The team has allocated sufficient resources to the new research perspectives. The cutting edge nature of the research plan is partly reflected in the ERC funding which is highly competitive.

- Conclusion

Given the strong impact of the team both nationally and internationally and the strength of the planned research, the team gives an excellent impression.

The strength of the team clearly lies in the unique combination of competences that are present in the team combining methodological and content-related expertise.

The publication output of the team, even though excellent, still leaves room for further improvement.

- Summary

The team is clearly visible on the national and international level. The integration in the institute is excellent. The team combines strong a methodological competence with a clear research program. Furthermore, the team recently acquired a highly competitive ERC starting grant. In summary, the team is doing very good research with a high potential for the future.

- Strengths and opportunities

The strength of the team clearly lies in the unique combination of competences, combining methodological and content-related expertise. In particular, the strong experimental background together with the methodological expertise in EEG, TMS and also fMRI is remarkable. Furthermore, the team gives a very homogeneous impression. The integration of the group within the institute is excellent. Finally, with the ERC starting grant of Boris Burle the team has demonstrated that it is highly competitive on the international level and shows a high potential for future achievements.

- Weaknesses and threats

The publication output of the team, even though very good, still leaves room for further improvement. Given the size of the group one could expect more publications in high-ranking journals.

- Recommendations

The group plans to expand in new fields, namely developmental psychology and the influence of social factors. The group should be careful that these new fields keep well integrated in the current research program to preserve the homogeneity of the group.

Team 3: Neural bases of spatial cognition

Team leader: Etienne SAVE

- Staff members

	Past	Future
N1: Number of researchers with teaching duties (Form 2.1 of the application file)	1	3
N2: Number of full time researchers from research organizations (Form 2.3 of the application file)	2	2
N3: Number of other researchers including postdoctoral fellows (Forms 2.2, 2.4 and 2.7 of the application file)	1	1
N4: Number of engineers, technicians and administrative staff with a tenured position (Form 2.5 of the application file)	0	0
N5: Number engineers, technicians and administrative staff without a tenured position (Form 2.6 of the application file)	0	
N6: Number of Ph.D. students (Form 2.8 of the application file)	8	
N7: Number of staff members with a HDR or a similar grade	2	2

- Appreciation on the results

The research developped by this team concerns the neural mechanisms of spatial cognition in rodents. It aims at: identifying the neural circuits involved in spatial behavior, understanding how the activity of place cells (hippocampus) and grid cells (entorhinal cortex) contribute to orientation of the animal, and at unraveling the molecular events supporting spatial memory.

This research team maintains good quality and quantity of publications (19 for three researchers), with seven of them published in high rank journals such as Science, Nature Neuroscience, PNAS (x2) and Journal of Neuroscience (x3), and six other articles in journals considered as very good by the AERES. Five chapters in collective books were also published. The members of the team supervised eight PhD theses, among which two are still in progress.

The team maintains stable collaborations with several laboratories at national and international levels, notably with the world leaders of this field of research.

- Appreciation on the impact, the attractiveness of the team and of the quality of its links with international, national and local partners

The members of this team have a good international recognition and have been invited for international (7) and national (8) conferences. They regularly participate in PhD or Habilitation committees (34) and are referees for international funding agencies. One of them is member of several international editorial boards, and they all act as referees for international journals.

The team has recruited one high level assistant professor coming from abroad, as well as two post-doctoral fellows.

During the past four years, they raised 7 research grants including 2 ANR (Neuroscience, “Jeune Chercheur”) that helped in their maintaining high level of scientific productivity. For the coming years they obtained two new ANR grants (Neurobot, MolCellCog) as participants of collaborative projects that will cover expenses for two of the projects they plan to perform.

The team does not mention participation to formal international networks, but it maintains active collaborations with several laboratories worldwide, as attested by six commonly signed articles.

The concrete results of the research activity and socio-economic partnerships

Science public education has been actively carried out by the team, through articles in popular science magazines (e.g. La Recherche, Pour la Science…) and through organization of scientific events for the public (e.g. Semaine du Cerveau…). Robotics is a field of natural application of the scientific knowledge generated by the team.

- Appreciation on the scientific strategy and the project

The project is in continuation of previous research and will further develop a system analysis of prefronto-striato-hippocampal interactions in spatial cognition. Building on the arrival of new competences in the team, a new project, concerning the molecular bases of spatial memory will be developped. All questions addressed are actual and exciting, and the techniques employed are well mastered by the team for most of them. New techniques, such as multisite recording with high density electrodes, and LFP data processing deserve further time and human ressources from the team.

At the moment, funding is available for two of the projects. Although the team has so far been globally successfull in fund raising, the feasability of the other projects can be questioned.

The great interest of the research planned resides in its multi-level approach of spatial cognition, ranging from molecular to behavioral via cellular and systemic processes.

- Conclusion

  - Summary

Team with high quality scientific production and national/international reputation solidified by the recruitment of new faculty members with different/complementary expertises.

  - Strengths and opportunities

The team is highly productive, interactive and motivated. It has now reached a size compatible with the planned objectives of research.

  - Weaknesses and threats

Demonstration of the feasability of the projects is not warranted, concerning both fundings and technical expertise in new techniques of recording (multisite with high density electrodes) and LFP data processing. Probably, collaborations with other laboratories expert in these areas, as they plan to do, will remedie this weakness.

  - Recommendations

The members of this team can be commended for their previous achievements and encouraged to maintain the quality of their scientific productions. Given their current expertise, they may consider: (1) to invest time and human ressources to improving recording and data analysis skills, and (2) to aim at more risk taking/cutting edge projects.

Team 4 : Multisensory control of movement

Team leader: Jean BLOUIN

- Staff members

	Past	Future
N1: Number of researchers with teaching duties (Form 2.1 of the application file)	2	2
N2: Number of full time researchers from research organizations (Form 2.3 of the application file)	1	1
N3: Number of other researchers including postdoctoral fellows (Forms 2.2, 2.4 and 2.7 of the application file)	1	2
N4: Number of engineers, technicians and administrative staff with a tenured position (Form 2.5 of the application file)	0	0
N5: Number engineers, technicians and administrative staff without a tenured position (Form 2.6 of the application file)	0	
N6: Number of Ph.D. students (Form 2.8 of the application file)	5	
N7: Number of staff members with a HDR or a similar grade	2	2

- Appreciation on the results

This team had 19 publications since 2006 with 17 of them containing one member of the group as first or last authors. The journals included very competitive ones such as Neuroimage, Cerebral cortex, Journal of Neurophysiology. The publications of the group have also clearly improved over the past years and the arrival in the Unit in 2008 is certainly an opportunity to confirm that trend during the next years if the group want to keep an A ranking.

- Appreciation on the impact, the attractiveness of the team and of the quality of its links with international, national and local partners

The team has a large network of local, national and international partners, which is impressing being its small size. The team leader is an internationally recognized scientist. The team have numerous national (University of Savoie ; Hôpital Timone, Marseille) and international (Max-Planck Institute, Germany, University of Montreal, Laval University, Luc Tremblay University of Toronto) collaborations. The group supervised 5 undergraduate student supervision (2006-2010) and 5 Doctoral dissertations (4 PhD defense), which also shows its attractiveness.

- Appreciation on the scientific strategy and the project

The team projects cover a wide range of topics : they intent

  - to investigate the sensorimotor transformations linking vestibular apparatus and the upper limb during movement planning.
  - to explore the influence of ocular dominance in sensorimotor transformations. At the behavioral level, characteristics of visually-directed movements will be studied with respect to the ocular dominance of subjects.
  - to determine how targeted is dynamic sensory weighting during the course of the movement. The hypothesis is that only signals arising from canals that are not expected to convey information are transiently suppressed during step initiation.
  - to study Effects of visual masking on target location coding will be studied in purely perceptual

- tasks (without motor response) and in sensorimotor tasks (eye and hand movements). This project also contains a modeling part based on a network of spiking neurons that is a model of the output part of the oculomotor system.
- to record the event-related potentials during stepping movements to test that the hypothesis that afferent information is processed for the forthcoming postural adjustments independently from the focal leg movement. These experiments will be carried out in both normogravity and microgravity (parabolic flights).
- to test the hypothesis that the gamma-band activity could peak when the body or part of the body has reached a spatial goal with experiments involving whole-body displacements and goal-directed arm movements in controls and patients suffering of postural instability.

None of these objectives are impossible per se but it would clearly need a bigger team and more than four years to solve half of the questions risen in this list. Therefore the committee recommends the team a- to focus on a more limited number of objectives, b- that these objectives are sufficiently interconnected.

Conclusion

Summary

This team, lead by an internationally recognized scientist, has a very expertise in the Multisensory control of movement. It is an important field, which is grossly underdeveloped in France. The multiplicity of the projects, which are proposed demonstrate the capacity of the group to generate news and exciting questions on the problem of sensorimotor transformations. Finally, the transition from a STPS environment to the Pole 3C was challenging. As shown by the augmentation of the HF of the publication of the team, which should be confirmed in the coming years, it appears that the team is on a good track.

Strengths and opportunities

The field of the control of movement is very important also interm of applications in the clinics, in sport and for ther management of the senior population. That is to say that this team is capable to educate the young researchers which are badly needed in these fields both in the private and public sector.

Weaknesses and threats

As pointed above, the projects are too numerous.

Recommendations

Therefore the number of themes of research for the coming years should be diminished and choosen ad to promote a good interaction between the members of this team. being the teaching assignement of two of the memebers to enlarge the team by recruting a young colleague of the CNRS or Inserm.

Team 5 : Spatio-temporal dynamics of auditory and motor learning

Team leader: Ms. Mireille BESSON

- Staff members

	Past	Future
N1: Number of researchers with teaching duties (Form 2.1 of the application file)	2	3
N2: Number of full time researchers from research organizations (Form 2.3 of the application file)	4	2
N3: Number of other researchers including postdoctoral fellows (Forms 2.2, 2.4 and 2.7 of the application file)	3	3
N4: Number of engineers, technicians and administrative staff with a tenured position (Form 2.5 of the application file)	0	0
N5: Number engineers, technicians and administrative staff without a tenured position (Form 2.6 of the application file)	0	
N6: Number of Ph.D. students (Form 2.8 of the application file)	13	
N7: Number of staff members with a HDR or a similar grade	3 *	3

* 6 co-direction of PHD thesis

- Appreciation on the results

This team is evidently well received and has substantially contributed to the rapidly advancing field that investigates neuroplasticty in skilled musicians and the transfer effects from acquired musical expertise to the realm of language. Her group was the first to show that long-term and short-term musical training in children and adults strengthens the ability to note subtle prosodic differences in first and foreign languages. Recent work has extended this approach to tonal languages and the potential effect of musical training on the treatment of developmental dyslexia. These results bear enormous implications for the remediation of language development disorders. The findings have been published in excellent journals (Cerebral Cortex, Journal of Cognitive Neuroscience) that are mostly noted by the like-minded scientific community. Meanwhile several research labs all over the world have started to replicate results obtained in this team and have extended the conclusions to related fields.

Quality and number of publications are above average with respect to the field that is addressed by Prof. Besson. The groups is internationally very well visible and belongs to the leading forces that drives progress in this field. The junior researchers who emerge from this group usually become independent and well established senior researcher who have developed impressive careers.

- The quality and the stability of partnerships

The research performed in this team has been doing in the last decade was mostly “in group” work. National and international collaborations have not been mandatorily necessary to run the studies. However, with respect to the planned project it should be mentioned that the slightly differential topic and targets require collaborative work in particular with experienced psychiatrists and physicians as comprehensive work with psychiatric patients is planned. The same holds for the part of the project that seek to apply environmental sounds that need to be physically generated. According to proposal proficient collabortive partners to guarantee success have been identified and named.

- Appreciation on the impact, the attractiveness of the team and of the quality of its links with international, national and local partners

The members of the group are really active and frequently present at international conferences as is apparent from the "bilan de l'èquipe".

The PI's research is focused on language comprehension which makes it difficult for scientists from abroad to simply join the group unless those individuals are not fluent speakers of French. Apart from that her group is regularly reinforced by bright and intellectual researchers at all levels. An emphasis should be put on the collaborative relationship with s a world leading expert of highest repute in developmental dyslexia.

This group has established a stable network of collaborations with local, national, and international research groups. Interestingly, in the recent past, the team leader has seriously become engaged in building up neuroscience research activities in arabic countries, namely Egypt, Marocco, and Tunisia.

PI's research during the recent past have had a substantial impact on the field of neuroplasticity. Due to the results of this team, a rapidly increasing number of labs in several countries have begun to research transfer effects from the musical domain to other cognitive domains, in particular language but also mathematical skills. The progress in this field and the successful knowledge of these insights in the context of treatment of dyslexia by means of musical training is by all means PI's merit.

- Appreciation on the scientific strategy and the project

This group has provided a long term scientific project that seeks to follow several research tracks. The three sub-projects have in common that they plan to apply brain imaging methods (fMRI and EEG) in the context of human cognition. While projects 1 and 2 aim to investigate the neural substrates of how meaning emerges from the decoding of acoustic spectro-temporal information available in environmental sounds project 3 is meant an investigation of disturbed concepts of meaning in psychiatric patients. The aims of project 1 and 2 are innovative, timely and of utmost interest. The projects are feasible and bear enormous implications for the understanding of the cerebral organization of the to date underinvestigated concept of meaning. Project 3 might be considered quite heterogenous as it aims to focus several really distinct psychiatric disorders, namely bipolar disorders, schizophrenia, HIV cognitive impairment etc) Maybe it would be more convenient to reduce the range of disorders at issue and to concentrate on one or maybe two categories to make the aims less ambitious.

The core issues of the project (meaning and handwriting) are original could be considered really innovative research programmes.

- Conclusion
  - Summary

This groups is a world leading group in human cognitive neuroscience of language and music. Her methodological expertise in functional brain imaging and auditory cognition makes her an important reinforcement of the future lab.

  - Strengths and opportunities

The major strengh of this team contribution is her knowledge of how combine research questions in the context of human neurocognition with the most suitable brain imaging methods and appropriate experimental designs. Her pool of colleagues makes a brilliant intellectual team to perform the proposed research programme at the highest level. The topics of the research plan are of utmost relevance and should be considered pioneering work. Furthermore I see the potential of establishing fruitful inter-team collaborations with Team 2 and team 4 pertaining to issues of motor learning and cognition.

  - Weaknesses and threats

Project 3 is too heterogenous. Maybe the planned research issues should be even more extensively studied by means of EEG rather than fMRI because the former technique is cheaper, less susceptible to technical breakdowns and comes along with superior temporal resolution which is not an trivial issue in the context of research of human cognition.

- Recommendations

Team 5 should by all means be part of the future lab because this group is supposed to do pathbreaking work tht will significantly advance out understanding of human cognition and visuo-motor integration in the future years.

Intitulé UR / équipe	C1	C2	C3	C4	Note globale
LNC- LABORATOIRE DE NEUROBIOLOGIE DE LA COGNITION	A	A	A+	A	A
COGNITION AND PATHOPHYSIOLOGY OF THE BASAL GANGLIA [POUCET-AMALRIC]	A	A	Non noté	A+	A
SPATIO-TEMPORAL DYNAMICS OF AUDITORY AND MOTOR LEARNING [POUCET-BESSON]	A	A	Non noté	A	A
NEURAL BASES OF SENSORI-MOTOR BEHAVIOR [POUCET-BLOUIN]	A	A	Non noté	B	A
ATTENTION, CHRONOMETRY AND CEREBRAL DYNAMICS [POUCET-HASBROUCQ]	A	A+	Non noté	A+	A+
NEURAL BASES OF SPATIAL COGNITION [POUCET-SAVE]	A+	A+	Non noté	A	A+

C1 Qualité scientifique et production

C2 Rayonnement et attractivité, intégration dans l'environnement

C3 Gouvernance et vie du laboratoire

C4 Stratégie et projet scientifique

Statistiques de notes globales par domaines scientifiques

(État au 06/05/2011)

Sciences du Vivant et Environnement

Note globale	SVE1_LS1_LS2	SVE1_LS3	SVE1_LS4	SVE1_LS5	SVE1_LS6	SVE1_LS7	SVE2 _LS3 *	SVE2_LS8 *	SVE2_LS9 *	Total
A+	7	3	1	4	7	6		2		30
A	27	1	13	20	21	26	2	12	23	145
B	6	1	6	2	8	23	3	3	6	58
C	1					4				5
Non noté	1									1
Total	**42**	**5**	**20**	**26**	**36**	**59**	**5**	**17**	**29**	**239**
A+	16,7%	60,0%	5,0%	15,4%	19,4%	10,2%		11,8%		12,6%
A	64,3%	20,0%	65,0%	76,9%	58,3%	44,1%	40,0%	70,6%	79,3%	60,7%
B	14,3%	20,0%	30,0%	7,7%	22,2%	39,0%	60,0%	17,6%	20,7%	24,3%
C	2,4%					6,8%				2,1%
Non noté	2,4%									0,4%
Total	100,0%	100,0%	100,0%	100,0%	100,0%	100,0%	100,0%	100,0%	100,0%	100,0%

*** les résultats SVE2 ne sont pas définitifs au 06/05/2011.**

Intitulés des domaines scientifiques

Sciences du Vivant et Environnement

- **SVE1 Biologie, santé**
  - **SVE1_LS1 Biologie moléculaire, Biologie structurale, Biochimie**
  - **SVE1_LS2 Génétique, Génomique, Bioinformatique, Biologie des systèmes**
  - **SVE1_LS3 Biologie cellulaire, Biologie du développement animal**
  - **SVE1_LS4 Physiologie, Physiopathologie, Endocrinologie**
  - **SVE1_LS5 Neurosciences**
  - **SVE1_LS6 Immunologie, Infectiologie**
  - **SVE1_LS7 Recherche clinique, Santé publique**
- **SVE2 Ecologie, environnement**
  - **SVE2_LS8 Evolution, Ecologie, Biologie de l'environnement**
  - **SVE2_LS9 Sciences et technologies du vivant, Biotechnologie**
  - **SVE2_LS3 Biologie cellulaire, Biologie du développement végétal**